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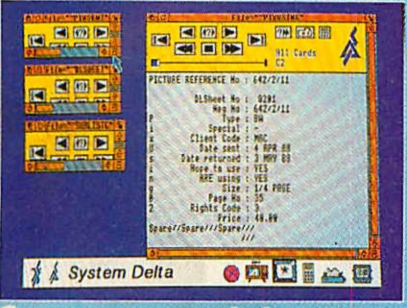
ACORN USER

JULY 1988

BEST-SELLING AND BIGGEST BBC/ACORN MAGAZINE

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3"

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HQP45	£386
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P5XL	£642
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192	£248
193	£362
292	£435
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294	£795
393M	£867
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LC10 COLOUR	£184
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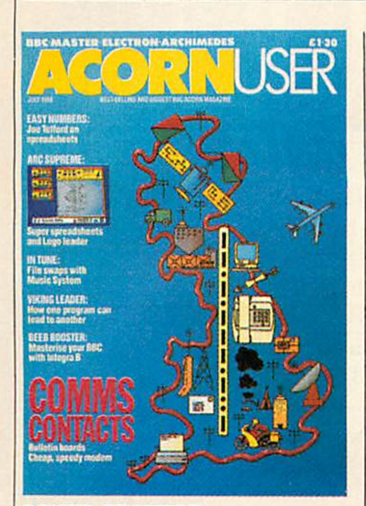
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Ac. U. 7/88

ACORN USER

ISSUE No 72 JULY 1988



COVER FEATURE
Bulletin boards and modems connect the nation – pages 58 to 63
Cover illustration by Andrew MacConville

EDITORIAL

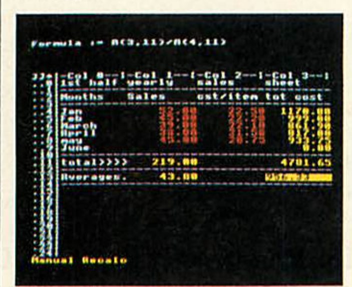
Part of the attraction of windows, icons, mice and pointers is the easy way you can run applications. Most of them look similar on screen, so you can often 'guess' how to do something – it's just like some other, more familiar piece of software.

The Arc Welcome disc has done untold damage; every program looks different. Now there's *Logistix* looking like a PC, *First Word* slavishly copying GEM, *Artisan* which looks like nothing before it, plus 101 other 'user interfaces'.

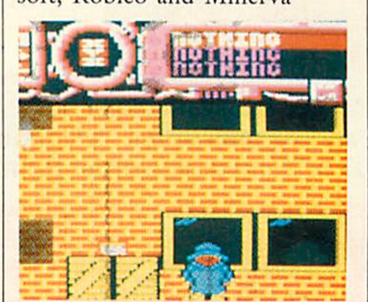
Acorn has to sort out what the Arthur WIMP system should look like – and soon – so the machine develops a 'personality'. It must provide a strong lead by producing an excellent WIMP application that everyone can use as a model. The advent of Arthur 2 in six months or so will be the only chance to get it right. If it doesn't, the Arc will never look as easy or as slick as the Mac.

NEWS

FEATURES

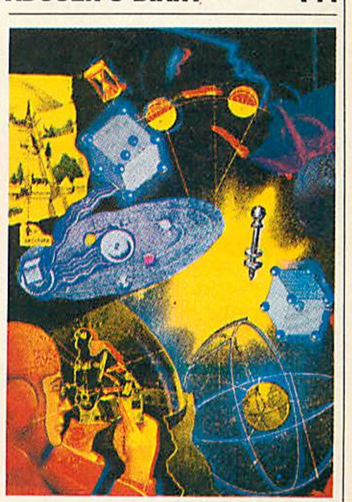


REVIEWS



EDUCATION

REGULARS



NEXT MONTH

The *Warlord* adventure, graphs and charts from Joe Telford's spreadsheet, scientific word-processors and PCB design

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Cambridge Computer

(as reviewed in December 87 Beebug)

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News

News in brief

■ A club for BBC micro users is now looking for new members. The Telford BBC Computer Club has met every Monday for the last four years and existing members have a range of computing interests. Several members have Archimedes and the club welcomes beginners as well as experienced hands on the BBC scene. Details are available from Steve Roberts on (0384) 288363.

■ IFEL has improved its *Wordwise* add-on *Wordwise Plus* 2 with a fast sorting program. It will sort paragraphs or lines by letter or numerically, and can sort 400 addresses in around five seconds. Another new utility helps with the memory management of long programs.

■ An intelligent file transfer system for the BBC and Archimedes is the latest product from AV Systems. Called *Teleport* it enables any BBC computer to be controlled from the Archimedes using the mouse and WIMP interface. Files and functions can be selected in this way, from both DFS and ADFS systems. A two metre connecting cable and a free art program are included in the £15.99 package.

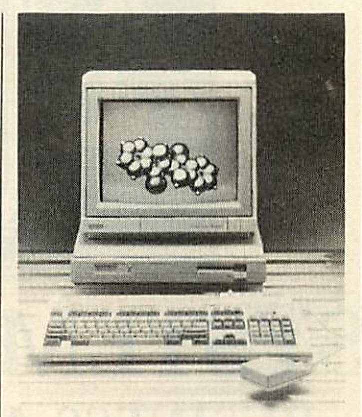
■ New software label Lingenuity has released a presentation graphics package for the Archimedes. *Presenter* will turn your figures into bar, line or pie charts. Information can even be displayed in three dimensions. The program is compatible with *Artisan, Graphic Writer* and *First Word Plus*, and data can be imported from spreadsheets. The package costs £24.95. Parent company Lindis is now distributing Acorn products abroad. Third-party developers looking for an overseas market can contact the company for details.

Acorn reveals Arc DTP plans

By Carol Atack

The Archimedes is entering the world of desktop publishing with the release of a program from GST software, developers of wordprocessor *First Word Plus*. The program is a development of American ST and PC program *Timeworks*, redesigned to run under Arthur 2. For contractual reasons the program will not be known as *Timeworks* but will have a new name, as yet to be decided by Acorn.

'The program is based on *Timeworks* but it has some extensions to capitalise on the Archimedes' capabilities' said Acorn's software product manager Ian Sewell. Although a demonstration version will be shown at September's PCW Show, Sewell does not expect the program to be made available until the end of this year. 'We are not going to rush it.'



Arc; new DTP package

One idea Acorn is considering is to market the machine and program together for dealers to add a laser printer and present as a complete desktop publishing package. However, Sewell was keen to point out that the package is being developed to support a wide range of printers. Users with dot matrix printers should be able to use it just as well as those with laser printers.

Project manager Tim Ward at GST said, 'The program will use some of the extra features of Arthur 2, such as multi-tasking. It will be possible to use the program at the same time as a wordprocessor or graphics program.' Arthur 2's improved on-screen graphics will be used as will the new WIMP interface.

Arc on tour

The Archimedes is going on a summer tour, taking it to towns in both the Midlands and the south-west.

Although Acorn has often arranged small scale demonstrations before, this is the first co-ordinated campaign. Area sales manager Kevin Coleman explained, 'It's Acorn's strategy to involve dealers more.'

The dealers involved are busy writing to potential customers in the areas of education, business and the home.

Acorn has arranged lectures about the Archimedes and its uses and software houses like Minerva and Clares will be demonstrating their programs for the machine.

Dealer Caroline Latif of Alpha Microtec in Solihull is looking forward to hosting the promotion. 'The Midlands has been a bit of a desert for Acorn support and this show is going to put Acorn on the map in the Midlands.' The Solihull show is on June 28, then moves to Bristol on the 29 and 30 of June, Exeter on the 6 and 7 of July, moving on to Cornwall on the 12 and 13 of the month. Further details of the show may be obtained from your local dealers.

If these mini-shows are a success Acorn plans to take them to other parts of the country, said exhibitions co-ordinator Roger Cranville.

New ROMs for old boards

SideAid 128 and 256 are two new 16k ROMs which are intended to make use of the Solidisk 128 and 256 boards simpler and provide an upgrade in some areas.

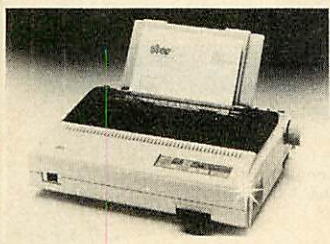
Features of the ROMs include an on/off shadow control and RAMdisc as well as a file copier. The 128 board additionally emulates Master commands such as *SRLOAD.

The chips cost £23 and £19 for the 256 and 128 respectively. A utility disc to enhance your use of the 256 board is £9, as is a *Tic-Toc* ROM which works with these products to improve the operation of the machine.

Dotted lines

The 24-pin dot matrix printer provides a much higher standard of print than the cheaper 8-pin, but has always been more expensive. Now Star Micronics has unveiled a £379 24-pin printer which includes features, like a choice of eight fonts, usually seen in more expensive machines.

The LC24-10 which features a carriage width of 10 inches has a maximum speed of 170 characters per second.



Star's new printer

Olympic

Tired of watching computer programs beat human players, a group of enthusiasts has organised a Computer Olympiad. Various machines and programs will play each other at the event in London in August. Games included are chess, bridge and draughts, and anyone who has written a program can enter. Further information is available from organiser David Levy on 01-624 5551.

Acorn boost

Acorn is on course for an improved performance over the next year, so says MD Harvey Coleman, speaking to a regional conference of Acorn dealers and distributors in Cambridge. He explained that sales for the first quarter of 1988 exceeded those for the same period last year. Marketing director Ian Laurence outlined plans for the rest of the year.

The Acorn team took this message to six further local conferences around the country, a new strategy.

Arthur 1.2 is not the end

The inability to print out any of the anti-aliassed fonts is just one fundamental problem with Arthur 1.2 that has worried software developers. Acorn has not licensed any font designs from Adobe, owners of PostScript, so the Arc can never show WYSIWYG displays for documents to be printed on a PostScript laser printer.

In addition, the number of bugs in Arthur 1.2 coupled with a wish to improve the desktop, WIMP and font systems, and the need to add at least a measure of multi-tasking, has led to Arthur 2.

Originally, Acorn claimed that Arthur 1.2 would be the final word in Arc operating systems, but Arthur 2 is currently undergoing testing with selected software houses. This fixes the reported bugs and enhances many of the modules. Arthur 2 is expected to be available at the end of the year.

■ In an interview with *Acorn User*, new Acorn technical director David Rees welcomed more feedback from *Acorn User* readers who have found problems with Arthur 1.2. He also confirmed that work is proceeding on refining the 'look' of the WIMP system, so future software will benefit from greater standardisation.

■ Impulse, Computer Concepts' rival Arc operating system reported last month in *Acorn User* 'will almost certainly be included free with our planned wordprocessing, drawing and desktop publishing packages,' said Rob Pickering of Computer Concepts.

Showdown pull out

A planned race between *Sigmasheet* and a team of city accountants from Touche Ross was cancelled after the accountants pulled out.

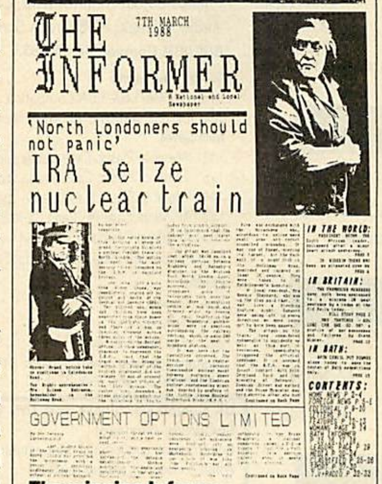
Sigmasheet, Minerva's superfast Archimedes spreadsheet, was on display at the Micro User show, and in a test seen by *Micro User* staff Peter Davidson and Mike Cowley, and by *Acorn User*'s Graham Bell, *Sigmasheet* recalculated an account sheet for 1260 branches of a company, in nine categories over 12 months of the year, in only 24 seconds. The printout of the account was over 75 yards long!

Unlike Minerva's *System Delta Plus* database, *Sigmasheet* doesn't use Arthur's windows, icons, menu and pointer system. But it's claimed to be nearly 200 times faster that *Logistix*, the other native Archimedes spreadsheet.

Schoolboys win Arc

Two schoolboys from Bath have won *Acorn User*'s and AMS's great newspaper competition. Their entry, *The Informer*, was decided to be the best by our panel of judges: group editor Tony Quinn, AMS's Nick Pearson and editor of *Expression* magazine Geoffrey Aquilina Ross.

Fourteen-year-old Oliver Wright and Mathew Steven's winning entry was planned as a national newspaper featuring a pull-out central section of local news. The paper was designed as a tabloid 'to make it easier to read on trains', although it would not be 'sensationalist' like existing tabloids and there would be a large proportion of news in both the national and local sections. 'Our computer teacher mentioned the competition and we thought we'd have a go,' said winner Oliver Wright. 'We designed it with *Stop Press* on the Master.'



THE INFORMER

7TH MARCH 1988

'North Londoners should not panic'

IRA seize nuclear train

IN THE WORLD:

IN BRITAIN:

IN BATH:

CONTENTS:

GOVERNMENT OPTIONS LIMITED

The winning Informer

Runners-up received prizes of £250 worth of AMS software. 13-year-olds Miles Essex and Andrew Sainsbury, who come from Pewsey, produced *Teenage Times*, aimed at people their own age. Features included pop charts and computer games, as well as sports coverage and quizzes.

Jason Cumming, Louise Smith and Liz Coulter from Coventry produced *The Indefinite Article* to appeal to readers aged from 16 upwards with its mix of 'hard-hitting journalism and entertaining gossip'.

The final winner was Roger Amos from Rugby whose *Rail User* is aimed at rail travellers and enthusiasts, carrying news about trains and timetables and features about enjoyable rail journeys.



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80col Printer Stand	£11.00 (c)
Universal Printer STand	£15.00 (d)
Printer Switch Box 2 Way "T" Switch	£39.00 (c)

Modems

All Modems inc BBC Lead

Miracle WS2000	£95.00 (c)
Miracle WS4000 Hayes Compat	£144.00 (a)
Pace Nightingale + Commstar II	£94.00 (c)
Nightingale Auto Dial Auto Answer Board + SW	£52.00 (d)
Pace Commstar II ROM	£28.00 (e)
Pace Linnet	£124.00 (c)

NB BABT APPROVAL ON MODEMS ONLY

Software

Acorn Soft

Micro Prolog	£50.00 (d)	ISO Pascal	£42.00 (d)
Logo	£44.00 (d)	BCPL	£39.00 (c)
Forth Disc	£14.00 (e)	Comal	£32.00 (d)
Lisp	£33.00 (e)	Hi View	£37.00 (d)
View professional	£75.00 (c)	View 3.0	£39.00 (d)
Viewsheet	£37.00 (d)	View Store	£37.00 (d)
View Spell (80T only)	£29.00 (d)	View Plot	£21.00 (e)
View Index	£10.00 (e)	Overview	£69.00 (c)
View Printer Driver Gen. Tape	£7.00 (e)	Disc	£8.00 (e)

Computer Concepts

Interword	£39.00 (d)	Inter Sheet	£39.00 (d)
Interchart	£26.00 (d)	Interbase	£49.00 (d)
Mega 3	£75.00 (c)	Spellmaster	£42.00 (d)
Wordwise	£30.00 (d)	Wordwise +	£37.00 (d)

Mirrorsoft

Fleet Street Editor	£31.00 (d)	Fonts and Graphics	£11.75 (e)

Clares

Fontwise +	£16.00 (e)	Replica III	£11.00 (e)

VINE MICRO REPLAY (State M/C and Disc Interface) £30.00 (e)

NB It is essential to state machine and 40/80T when ordering software

Books (No VAT on books)

Master Ref. Manuals Pt1 £14.00 (d) Pt 2 £14.00 (d)
Advanced Master ref Manual (Bray & Dickens) £19.95 (d)

Lisp	£8.00 (e)	Forth	£8.00 (e)	ISO Pascal	£8.00 (e)
BCPL	£14.00 (d)	View Guide	£6.00 (e)	Into View	£6.00 (e)
View 3	£9.00 (e)	View Sheet	£9.00 (e)	View Store	£9.00 (e)

Archimedes Ref manual	£29.95 (d)
Arm assembly language manual	£12.95 (e)
Mastering View ViewSheet and ViewStore	£12.95 (e)
Understanding Inter Word	£6.50 (e)

View – A Dabhand Guide £12.95 (e) Z88 Computing £9.95 (e)

Fanfold Paper and Labels

2000 x 1 Part 60gm 11 x 9.5" Micro Perf	£12.00 (c)
1000 x 1 Part 85gm 11 x 9.5" Micro Perf	£9.00 (c)
1000 x 1 Part 90gm "Perfect" A4 Micro Perf	£12.00 (b)
1000 89mm x 36mm Labels	£4.00 (d)
1000 89mm x 49mm Labels	£6.00 (d)
1000 102mm x 36mm Labels	£5.00 (d)

Please state Single or Twin Row when ordering labels





Archimedes gets a TOBIE award

The Archimedes has been voted the best new application of technology by readers of trade paper *Electronics Times*. It beat a new cordless telephone, the Zonephone, and a radio antenna, to receive one of the prestigious TOBIE (Technology or Business Innovation of Electronics) awards. Voters were impressed by Acorn's commitment to developing 32-bit RISC technology when other companies were playing safe and making products based on the 16-bit PC standard.

Acorn MD Harvey Coleman (right) received the award from *Electronics Times* publisher Roger Michael (left) and editor Mick McLean at the British Electronics Week Ball at the Grosvenor House Hotel in London. Other awards were made for categories which included achievement in research and for advances in fibre-optic and microwave technology.

Screen clips from Clares

When you go to the cinema the trailers are often the best bit, when highlights of the films distributors want you to see over the next few months are shown to grab your attention. Some video companies even put trailers on their cassettes, hoping you'll remember the films on your next visit to the shop.

Buy a piece of software and you're buying blind, with no chance to preview it apart from magazine reviews and friends' comments. Clares aims to change all that with an Archimedes demo disc. For £5 you can put your Archimedes through its paces with snippets from all Clares' upcoming software releases.

'People haven't seen what the machine can do' said software developer Dave Clare. 'This disc will stretch the machine to its limits.' Highlights include graphics produced by a ray tracing package: this is a complex program which produces images shown as if they were reflected from metal balls. 'The only way to produce these images is with a powerful computer like the Archimedes' said Clare.

A second disc may be produced featuring animations. Clare is also considering releasing versions of games produced for the Amiga and ST, although he does not expect to release any for some time.

THE COMMS COLUMN

■ Tubelink, the popular area on Micronet, is to be replaced by a new area run by two of its former contributors. The Tubelink magazine, which for years was updated weekly by schoolboy Benjamin Rietti, has lapsed in recent months while Benjamin concentrates on completing his A-Levels.

Now a replacement magazine will appear, edited by Ernest Bebbington, chief reviewer on Tubelink, and David Wild, former editor of the Pascal Link subsection. However, the new magazine will not be called Tubelink. This will avoid confusion with the Tubelink software house, owned by the enterprising sixth-former, which recently released a utility for *View* wordprocessor users.

■ Mercury Communications, the only company allowed to compete with British Telecom for mainstream telephone business, has at long last launched a major campaign to attract subscribers. Despite offering a demonstrably superior pricing structure, and such extras as tone-dialling and itemised billing, Mercury so far has had only a small share of the domestic and business telephone market, possibly due to its very low profile while building up the operational side of things, particularly in the international area. Comms users will find the cheaper long-distance and international phone calls particularly interesting, although those of you who use someone else's phone may not appreciate the itemised billing.

■ Microlink has completed its system upgrade announced some time ago, moving to a dedicated Prime 9955 Mark II computer which runs at three times the speed of the previous machine. The system software was upgraded at the same time to the latest level, Revision 19, which also improves access time and allows new features not previously possible. Moreover the new Prime 496 discs are claimed to be 25 per cent faster than before.

■ Microlink has also introduced a new service, Expertlink, which is like a bulletin board except that instead of just idle chit-chat, users can approach experts on particular topics such as management, natural sciences, exporting and, as you might expect, a whole range of computer activities.

■ Communications specialist Miracle Technology has changed its name to Miracom. The name change is part of its move upmarket to service corporate users, with a high-specification range of 9600-baud modems and other specialist devices. This is the second name change for the Ipswich-based firm. In the days when it catered solely for the home user it rejoiced under the name of Minor Miracles, with the SW2000 modem aimed at the home user.

■ Bulletin board spotlight this month falls on Odyssey, a Hull-based board run by James Willmott who uses his own software. You are asked, when you log on, whether you are using a Viewdata or ASCII terminal, and the system reconfigures itself accordingly. The board, which is clearly aimed at younger users, contains plenty of downloadable material including music, both for standard BBCs and for users of the ubiquitous Music 500. Also, there are many AMX *SuperArt* pictures. Non-computer sections include an area for *Neighbours* fans! The board runs 24 hours a day at V21 and V23 speeds, on 0482-870919, which is a System-X exchange and so should have reduced line noise.

David Atherton

Have you got any comms news? If so contact David Atherton either here at Acorn User, or on his mailboxes Prestel 942876210 or Gold 72:MAG11596.

News in brief

If you're an Archimedes user with a small desk and no room to manoeuvre your mouse, Pineapple Software has a solution. Dig out your old Marconi trackerball and unplug the mouse; then connect the Arc and trackerball with Pineapple's new adapter. One end of this plugs into the mouse socket and, a metre of cable later, terminates with a user port socket to which the trackerball attaches. The price for this space saver is £16.

■ Assembly language programmers can make their lives easier with a new macro assembler from Wingpass Computer Services. It produces Acorn object format files from assembly language source files, and runs under the operating system Arthur. Examples include a Mandelbrot program, an Arthur module and a factorisation routine. Complete with manual, it costs £34.50.

■ The flood of Archimedes applications continues with a 3D CAD and animation graphics package from Silicon Vision. The program also runs on the BBC. According to Silicon, the program will draw and display wire frame graphics, which then can be animated quite simply. A database is included to provide ideas and help beginners. As a special offer the company is selling the programs for £12.95 (BBC) and £19.95 (Archimedes). BBC owners with Epson-compatible printers can print out their efforts using the company's £15.95 Super Dump. An Archimedes dump program is promised soon.

■ If your room is littered with unused and unwanted computer equipment, Computeck has an answer. Its numerous educational clients are looking for used hardware and software, so Computeck will buy your surplus and sell it on. They hope you will then buy new software or equipment!

Flannelled statistics

The devotion of cricket fans to their favourite sport is legendary. The complex nature of the game especially lends itself to the collection and study of statistics during the long winters – and rainy summers – when little play is possible. Supporters can turn to the cricket bible, Wisden, for an analysis of batting averages, run rates and all sorts of esoteric but – to the dedicated cricketer – fascinating information.

Gathering statistics and analysing them is a time-consuming job, but one where the computer is ideally fitted to help. Cricket statistician and *Acorn User* reader Victor Isaacs keeps the score for county team Hampshire and is a leading expert on one-day matches. He has put all of Hampshire's playing history on to disc and is continually adding new scores to the database.

He began with a ZX81 computer, hoping that it would take the drudgery out of calculating and analysing the records


Hampshire CC: bowled over by the Master

he keeps. 'I'm using a Master now, and thinking of getting an Archimedes. Before that I had a Sinclair Spectrum and then a BBC model B, which I bought about six years ago.'

He uses Interword and Intersheet but is still looking for a suitable ADFS-compatible database. However with mathematician Dr Bob Whitham, he has developed a special cricket software package to work out averages and other statistics.

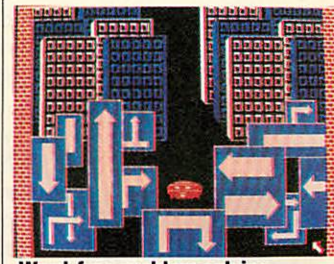
Data and statistics from Mr Isaacs' impressive collection have featured in a Wisden book on one-day cricket, as well as in the Hampshire county cricket year book, for several years.

DTP ROM

Following Watford's *Wapping Editor*, another desktop publishing ROM has hit the streets. *Publisher* hails from PMS Permanent Memory Systems, the company responsible for the pop-up utilities ROM *Genie*. The program will work on all Acorn/BBC micros from Electron to Compact and costs £44.85. The 64K ROMs contain 16 fonts, each of which is available in all sizes. The program can be accessed without leaving your wordprocessor, and codes may be entered for the fonts. You can see what you will get on printout by using the special command *PREVIEW, a facility which displays the page as it will look in hard copy.

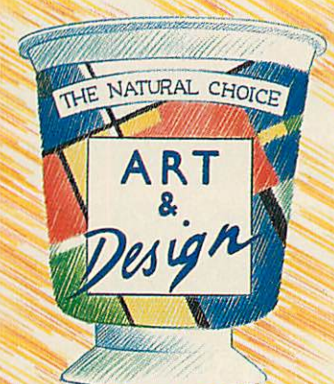
Word-free logic

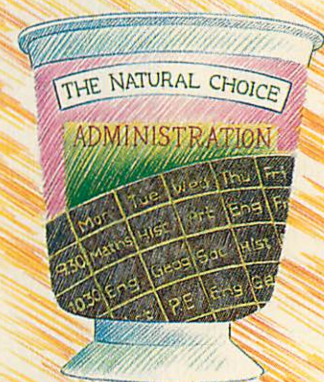
Communication and learning are often thought to rely on a mastery of language, but there are other skills such as logic and problem solving which aren't as reliant on words. *Worlds without Words,* the latest release from educational software developer 4Mation, is an exploration of these areas. The company regards it as its most ambitious project, following in the steps of classic programs like *Granny's Garden*.


Word-free problem solving

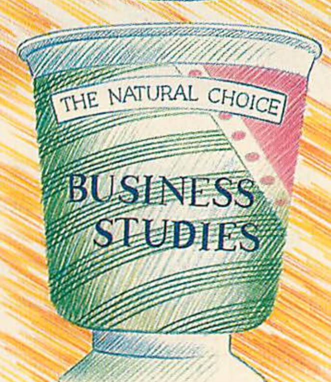
Although designed for use by nine year olds and over, many others will enjoy solving the problems. To get users in the mood, an hour of music is provided on cassette. Further touches of class are added by the sumptuous packaging, the books and the posters which illustrate the package. All four versions, for B, B+, Master and Compact, cost £28.75. The program is compatible with a wide range of input devices including Microvitec Touchtech, Concept Keyboard, Marconi Trackerball, switches and joystick. Screens can be printed using Integrex or Epson colour printers.

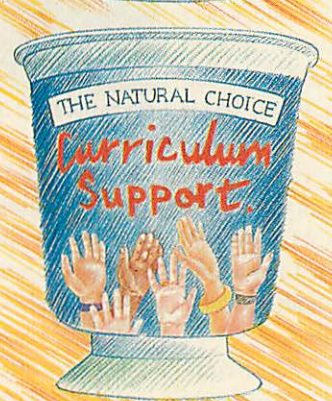
RM Nimbus, the one computer that caters for everyone.

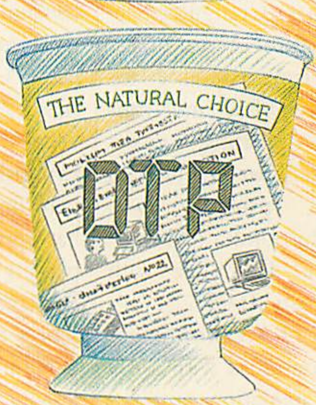












Most 'educational' computers force you to make unhealthy choices. You can have high speed – and very little software. Or slick DTP – on a screen like a letterbox. Or business roots – with little interest in education's special needs. (You can guess which machines we're talking about.)

Ten years of direct commitment to education have taught RM to do better. We know that computers aren't just for the elite. Skills must be spread around. The ideal machine must be an all-rounder: fast, networkable, with powerful graphics – and above all carrying a vast stack of software. And that describes the RM Nimbus.

Our Transitional Support Programme means that you can keep your bank of programs in BBC Basic.* PC compatibility gives you MS-DOS.* High-powered Nimbuses can run OS/2* or UNIX.* In short, we combine the riches of the main software traditions of the past, the present and the future. No wonder 90% of 16-bit computers in schools and colleges are Nimbus micro computers.

If your school installs a Nimbus network, much of this software is supplied free.† In fact, RM's list of *free* software is almost as long as some machines' list of *available* software.

Rather than one virtue – the Nimbus has many. Too many to list here. For more about the great all-rounder, contact us either at Oxford on 0865-791234 or Stockport on 061-477 1538, or write to Research Machines, Mill Street, Oxford OX2 0BW.









Registered Trademarks. †Free with networks: Microsoft Windows plus Microsoft Write,* Paint,* Notepad,* Cardfile,* Terminal,* Calendar,* Reversi,* Word 3,* Multiplan,* DataEase,* PC Paintbrush,* Contact,* Quest,* Oxfordshire Write,* RM CAD, Touch 'n' Go,* BBC Basic,* RM Basic, RM Pascal, RM Logo, Steed.*

Coloured stars

Schools on a tight budget needing a colour printer can look to Star. The LC10, with a wide variety of on-board fonts as standard, costs £259. It is fully compatible with all codes for the Epson EX800 series and is compatible with Artisan.

Artisan dumps colour

Presentations and pupil assessments can be given a professional touch with sophisticated printouts. Clares' Artisan support disc gives schools a way to produce high-quality prints of work created by pupils on Artisan, and display screens on a carousel system.

The display module comes with eight video-style fades and various 'dissolve' features. Screens may be loaded and displayed at any speed using any number of fades – the only limitation is the capacity of the disc system.

Many schools now venturing into colour printing will be able to improve the quality of their output with the dumps supplied on the disc. These are for the Integrex 132 and any Epson EX800 compatible machine. These dumps use the picture's own dedicated palette, rather than the standard Artisan palette as previously. A range of 4096 colours is available.

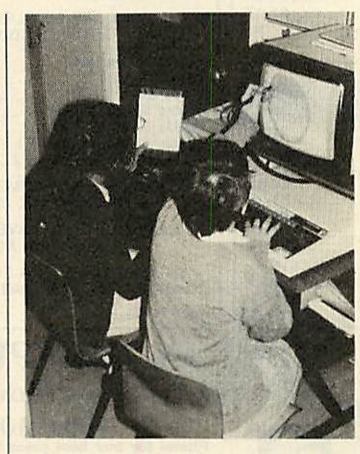
Monochrome print routines are also available for Epson FX and RX80 compatibles and come with a pattern editor for 'tweaking' your dump to suit the picture.

Head appointed to lead NCET

The NCET has appointed a chief executive to supervise the merger between the MESU and the CET. Dr Noel Thompson, currently a DES Under Secretary, will join the new organisation on June 6. In a brief statement he welcomed the chance to contribute to Britain's acknowledged leadership in computers and education, and to build on the existing work of the CET and MESU.

Thompson trained as an engineer before joining the civil service twenty years ago. One of his major interests is European co-operation and he has represented the department on EEC committees.

Norman Willis, the CET's acting director, welcomed the appointment. 'The important thing to be done is to weld the two organisations together, he said. However little planning has been done; the NCET's governing council met for the first time on May 18. Issues such as the relocation of either organisation have yet to be addressed, despite consensus that they should share premises.



'A condition of both organisations accepting the merger was that there was no disruption to existing research programs, Willis said. Plans for rationalisation, the purpose of the merger, and possible redundancies, were to be decided by Thompson and his council in the future.

Willis expects the merger process to take at least two years to complete.

MESU information officer Richard Beamish agreed that changes would be slow to come. MESU director John Foster is staying in charge of the Warwick-based unit for the time being as it assumes its new status.

Help with maths

Exam revision means that tutorial software comes into its own at this time of year.

BBC Soft's *Help Yourself-Maths* package is designed to introduce two main problem areas in a simple fashion, and deals with both equations and directed numbers.

The CSA technique (Computer Synchronised Audio) in this package effectively turns the computer into a low-level interactive video system. An audio cassette explains how the package works. Pupils then practise methods and test themselves before progressing to subsequent stages.

MESU breaks logger jam

Data capture, an important part of many science projects gets a boost with a data-logger released under the auspices of MESU (Microelectronics Education Support Unit).

A vital part of the microelectronics curriculum, monitoring and measurement in all aspects of science have yet to be fully exploited. Although equipment is already available – notably the VELA – its potential has not yet been appreciated and there is little in the way of teaching support materials.

MESU's data-logger is based on a single chip 6502 microcontroller and supports four analogue inputs as well as two 'fire-button' lines. It has user and parallel ports making it adaptable for control applications. There is also a 50-way expansion slot which makes sure it can cope with future developments in data capture technology.

Two versions of the system are expected, containing between 8k and 32k of RAM with an optional separate ROM facility for simultaneous dedicated operations. The device communicates with its host computer through a standard serial port, so it is compatible with nearly all micros.

Cold print

Freeze frame printing is going colour. ESM's Screenprint ROM, allowing screens to be sent to the printer during the execution of many programs, has a colour successor.

The new chip will allow the user to freeze the action in the same way as for Screenprint.

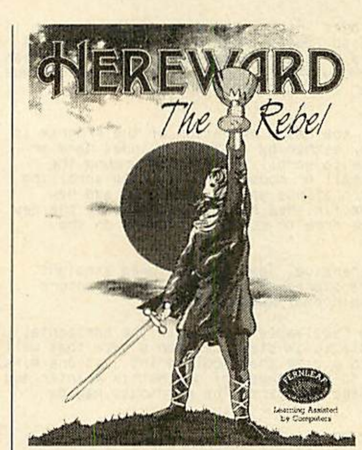
Soft survey

Acorn User is surveying the range of educational software available for the Archimedes. We will be sending out a questionnaire to all the software producers we know. Any new ventures should contact the *Acorn User* office for further details.

Saxons strike back as Hereward wakes rebellion

History lesson to adventure game: topic work will have the lure of interactive video with Fernleaf's *Hereward the Rebel* (£17.35). The lastest in its series of historical games, this package is designed to complement topic work on the theme of Norman or Saxon life.

The program involves pupils in helping Hereward, who is opposed to the Norman King William, to search for treasure and for men by obtaining information from a variety of sources. The program has two game options at two levels of difficulty. The pack includes a player's information booklet and a program guide as well as the program disc.



Hereward rallies the troops

Gujarati word-processor

Children in Brent schools will be able to wordprocess in Gujarati as well as English, from September. About a fifth of children in the borough speak the language and LEA officials hope that using the program will develop the children's interest both IT and the language and culture.

The program was developed in Brent by language teacher Shobhna Devani working at the Brent Micro-Technology Education Centre. The program, complete with the keyboard overlays needed to accommodate Gujarati's 36 letters, will be marketed by Tedimen Software as part of its Folio series.

Bacteriology for beginners

Food poisoning is better learnt about in theory than in practice. *Chicken*, which costs £14.95 from System Software, is designed to help pupils understand the conditions under which food poisoning happens. The simulation involves all aspects of food purchase, and deals with storage and cooking as well as an examination of the organisms that cause food poisoning and their related toxins.

The package assumes that all susceptible foods are contaminated to some degree at the time of purchase, and that it is the cook's problem to find ways of storing the food in such a way as to minimise the growth of harmful bacteria.

During the simulation the user is given a constant read-out of the levels of bacteria and toxins in the food and must make a careful balance which ensures that the bugs are killed by cooking while the food itself is not burned to a cinder.

The package is designed as a group activity for 11 to 16-year-old pupils in home economics, science and life skills classes (the House of Lords might also find it useful).

POST A PROBLEM

Acorn User has a guaranteed fast reply service for enquiries. Your answer will be returned within 10 working days for just £3 (includes VAT), or your money back.

Just write out your problem, fill in the coupon (right), and send both off to *Acorn User* with a stamped addressed envelope and cheque or postal order for £3 made out to Redwood Publishing. If you want recorded delivery add the cost of this on. Include as much detail as possible, and a disc or cassette if a program is involved, with enough space to record any corrected listing.

Please note: debugging readers' programs or those from other magazines is a complex task and we cannot guarantee to give a full solution. Unless the problem can be spotted quickly, the service will only be able to make general comments or suggest a strategy for the reader.

We will answer the problem and return all material received – within a guaranteed 10 working days from receipt. If we fail to match this promise then your cheque or postal order will be returned with the answered question – you can't lose!

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OFFICE USE ONLY Date in:

Date out:

Answered by:

PINEAPPLE SOFTWARE

Programs for the BBC model B, B+, Master and Master Compact with disc drive

DIAGRAM II now also available for ARCHIMEDES

Diagram II represents a major breakthrough in the techniques used for drawing software on the BBC micro. It works on a completely different principle to other drawing software by storing the drawing information straight to disc as coded 8*8 pixel blocks.

This technique has three major advantages. First, the size of the diagram is only limited by the amount of space on disc. Second, there is no limit to the amount of information which can be stored on a given diagram as the information is stored on disc and not in computer memory. Third, the disc storage technique allows the smooth scrolling of the screen over the whole surface of the diagram.

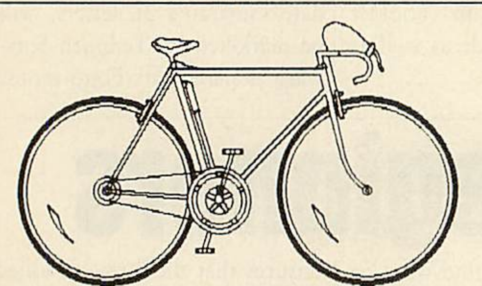
For people not familiar with Diagram, the basic operation of the program is to first display any part of the diagram, either by quoting an index name or screen number. At this point you are free to scroll the diagram around the screen using either cursor keys, trackerball or mouse. You may stop scrolling at any point and enter the edit mode which allows you to modify or add new information to the diagram. When you have finished making alterations, the new information is stored to disc and you are free to scroll elsewhere on the diagram stopping to edit at any time.

The edit features are now very comprehensive. Text may be typed straight from the keyboard, and if other fonts are stored as user defined characters then these fonts may be printed using the normal keyboard keys.

The print routines are now completely 'scaleable' with both the horizontal and vertical scales being totally variable in 1% steps between a size that will give 18 mode 0 screens on an A4 sheet and a size that would print just one pixel on a sheet! The routines are adaptable to most types of dot matrix printer and full advantage may be made of wide carriage printers. The printouts may be rotated through 90 deg. if required.

The new editing features make DIAGRAM II suitable for all types of serious drawing application including scale drawings, flow charts, architectural, family trees, and many other subjects as well as circuit and schematic diagrams. As an example of what Diagram II can do, this complete advertisement (with the exception of the PCB drawing) has been produced with the package.

1. Works on any model BBC computer with either DFS or ADFS.(ADFS only if Shadow memory available).
2. Will automatically take advantage of shadow memory (any make) to provide more User Definable Characters, 880 with Shadow, 381 without Shadow.
3. Rapid horizontal and vertical line drawing routine with automatic joins for circuit diagrams.
4. Full rubber band line drawing and circle drawing modes.
5. Takes advantage of the Acorn GXR rom to provide drawing of arcs, sectors, chords, parallelograms, ellipses, and flood filling. Note this rom is already fitted to Master and Compact machines.
6. Pixel cursor drawing and deleting mode allows very fine detail to be added.
7. Defined areas of screen may be moved, copied, deleted or saved to disc.
8. On-screen indication of cursor position shows either the cursor position on the overall diagram or the distance from a preset point.
9. Keyboard keys may be predefined to print User Defined Characters, enabling new character sets to be stored as user defined characters and then printed straight to the screen using the keyboard keys.
10. Wordprocessor files may be loaded to the screen and automatically formatted into any shape screen area.
11. Index names may be set up to point to given areas of a large diagram, to enable rapid access to a given point on a diagram.
12. Fully compatible with Marconi trackerball and most makes of mouse.
13. All Diagram 'Utilities' are included, enabling screen ident numbers and borders to be added, and any area of diagram to be moved or copied. The whole diagram may be displayed in reduced scale (either 4*4 or 8*8 format) on a single screen, and the size of the overall diagram may be increased or decreased.
14. Completely scaleable print routines allow any area of the diagram to be printed either horizontally or through 90 deg. in scales that may be varied in 1% steps allowing up to 18 mode 0 screens to be printed on an A4 sheet (still with readable text).
15. Complete with 40 page easy to understand handbook.



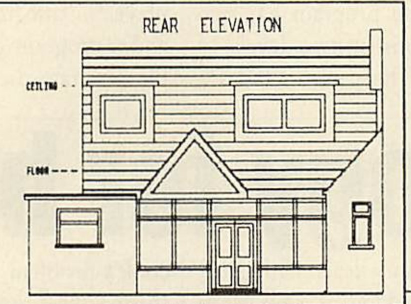


Diagram II consists of a set of disc files and a 16k Eprom. The disc supplied is formatted in 40T on side 0 and 80T on side 2. Please state if this is unsuitable for your system, or if you require a 3.5" Master Compact disc.
ARCHIMEDES version on 800k 3.5" disc.

DIAGRAM II — £55.00 + vat

P & P free (except overseas)

N.B. Upgrades are available to existing Diagram owners. Please contact Pineapple if you have not received an upgrade letter.

PCB

Pineapple's now famous printed circuit board drafting aid produces complex double sided PCB's very rapidly using any model BBC micro and any FX compatible dot-matrix printer.

The program is supplied on Eprom and up to 500 component and 500 ASCII component descriptions may be stored for each PCB. There is no limit to the number of tracks that may be stored for a given PCB although the maximum board size is restricted to 8" * 5.6".

Using a mode 1 screen, tracks on the top side of the board are shown in red, while those on the underside are blue. Each side of the board may be shown individually or superimposed. A component placement screen allows component outlines to be drawn for silk screen purposes and component numbers and outlines entered on this screen may be displayed during track routing to aid identification of roundels.

The print routines allow separate printouts of each side of the PCB in a very accurate expanded definition 1:1 or 2:1 scale enabling direct contact printing to be used on resist covered copper clad board. The print routines are very fast taking typically 5 minutes for a 1:1 print of a 7" * 5" board.

This program has too many superb features to describe adequately here, so please write or 'phone for more information and sample printouts.

PRICE £85.00 + VAT

Plotter Driver to suit most plotters £ 35.00 + vat



PCB AUTO-ROUTING

This brand new addition to the PCB program greatly increases the power of the software and speeds the design of PCB's even more.

A connection list of up to 190 connections may be entered in the form of a 'rats nest' and then the computer does the rest!

You may specify which side of a board you wish the track to be on or leave the choice to the computer, and you may also say whether tracks should be allowed to pass between I.C. pins. Tracks may still be drawn manually at any time so boards may be produced by a combination of manual and auto techniques if required.

The program is in the form of a second Eprom and all the features are available even with an unexpanded model 'B' computer.

Please write or 'phone for full details.

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MARCONI TRACKERBALL

This high quality device comes in three versions. Version one is for the standard BBC micro and comes with the Icon Artmaster drawing package from Micro-Draw, and Trackerball Utilities which allow the trackerball to be used with other software.

Version two is for the Master 128 computer and this comes with the Pointer Rom. This is a Rom which allows the Master to be configured for use with the Trackerball and has commands to enable the Trackerball to intercept the cursor key or joystick routines of other software. Commands are also available to reverse the axes of the trackerball and set the sensitivity. The three buttons may also be set up to produce any ASCII code.

Version three is simply the bare Trackerball which comes without software but is suitable for use with specially written software such as Diagram or Diagram II.

Trackerball adapters are also available which plug onto the end of the cable and convert the connections of the trackerball to be the same as a mouse. This enables the trackerball to drive all types of 'mouse' software.

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ADFS Utilities Rom — ADU

ADU is an invaluable utility for all ADFS users. It adds over 22 new *commands to the ADFS filing system as well as providing an extensive Menu facility with over 35 sub commands covering areas such as repeated disc compaction, saving and loading Rom images, auto booting of files and many more.

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Additional *commands include:- *ADU, *BACKUP, *CATALL, *CHANGE, *DFSDFS, *DIRALL, *DIRCOPY, *DIRDESTROY, *DIRRENAME, *DISCEDIT, *DRIVE, *FILEFIND, *FORMAT, *KILLADU, *LOCK, *MENU, *PURGE, *PWRBRK, *UNLOCK, *VERIFY, *VFORMAT, *WIPE

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Silicon Vision Ltd, Signal House, Lyon Road, Harrow HA1 2AG. Tel: 01-422 2274.
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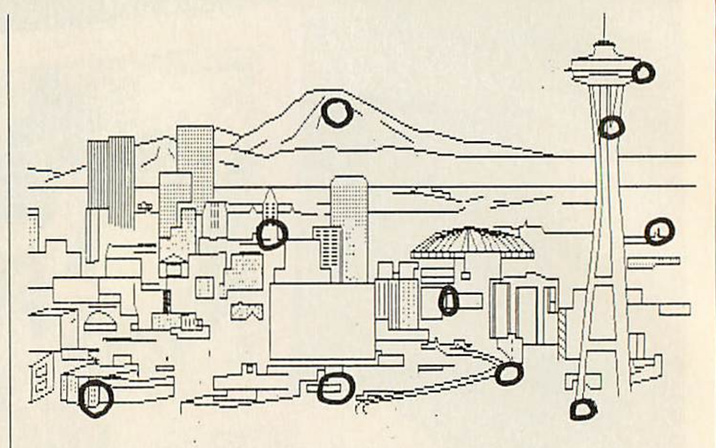
BLUNDERBOX

Thanks to J Nichols and P Jennings for pointing out an error in Hints and Tips, February 1988 issue. The error occurred in Martin Phillip's Disc menu.

The corrections required are:
delete line 630
add a new line –
655 * FX 4,0
change the line number after the GOTO in lines 640 and 650 and 510.

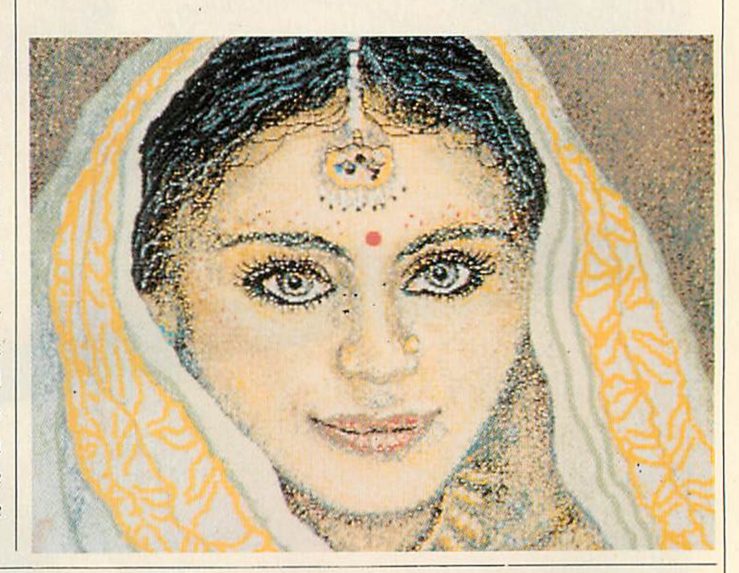
Competition roundup

Our March spot the difference competition attracted many entrants keen to win the prizes of a selection of *Acorn User* software. The three winners who will receive copies of our Graphics Utilities, Portfolio discs and UserDump ROM are CD Middleston of Nottingham, RE Drew of Cambridge, and Robin Stephenson of Faversham. They will be receiving their prizes shortly. The differences between the two views are circled on the right.



■ Due to reader demand our Clares Artisan competition is being extended until further notice. This month's winner is Mrs M J Goodchild of Trumpington, Cambridge, with her finely textured portrait of an Indian woman.

Please carry on sending your pictures to Dave Clare at Clares Micro Supplies; he will continue to give a box of discs to each month's winner. When the competition closes the overall winning picture will be turned into an oil painting.



Next month

August's issue of *Acorn User* brings you the first part of our adventure game, *The Warlord*, written by Peter Voke. Explaining the program, which appears on our monthly disc, Peter looks at the history of the adventure game and its enduring popularity. Joe Telford brightens up your summer with a graphics program to display the data in last month's spreadsheet program.

David Atherton has the latest of your hints and tips for the BBC micro and Dave Acton rounds up Archimedes ideas in *Agora*. Sam Greenhill tries out the latest games, plus all the usual news and reviews pages to keep you up to date with the Acorn world.

Reader disc services

Due to popular demand, *Acorn User* is now making the monthly listing disc available in the 3.5-inch format.

Compact and Archimedes owners no longer have to sit in sullen silence, missing out on all those wonderful programs and graphics. Discs are available for every issue this year, including March's Archimedes special with its windowing and Mandelbrot programs designed to show off the machine's power.

The price is £7.95. Cheques should be made out to Redwood Publishing and orders sent to *Acorn User* Monthly Disc Offer, 20-26 Brunswick Place, London N1 6DJ.

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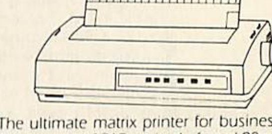
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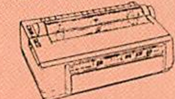
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MULTISYNC PLUS 695.00
This 15 inch, high resolution (1024 x 768) monitor is ideal for use with IBM/XT/AT and PS/2 plus Apple Mac II and othe IBM PC compatible microcomputers. It automatically scans all horizontal frequencies from 21.8 KHz to 48 KHz and vertical frequencies ranging from 50 to 90 HZ. It supports EGA, enhanced EGA, PGC, MCGA, and VGA colour graphics standards.

MULTISYNC II 495.00
This redesigned 14" MultiSync high resolution monitor offers all the benefits of the previous model such as automatic synchronisation, suitable for use with IBM/XT/AT and PS2 plus Apple Mac II and compatible with Hercules, MDA, CGA, EGA, EGA+, PGC, and VGA graphics standards plus front mounted user controls and automatic selection of Analog/TTL and Vertical Hold modes.

MULTISYNC XL 1575.00
A 20 inch colur monitor offering a resolution of 1024 x 768 and has automatic synchronisation of horizontal and vertical scan, from 21.8 to 50 KHz horizontally and from 50 to 90 HZ vertically. This monitor is ideal for CAD/CAM applications

MULTISYNC GS 149.00
Offers the user a high resolution (720 x 480), 14 inch monochrome display which is hardware compatible with IBM PC, XT, AT, and PS/2 machines. The MultiSync GS supports MDA, Hercules, CGA, EGA, MCGA and VGA display standards. It automatically locks on to one of five frequencies from 15.7 to 31.5 KHz to suppport all the above major graphics standards and three vertical frequencies ranging from 50 to 70 HZ.

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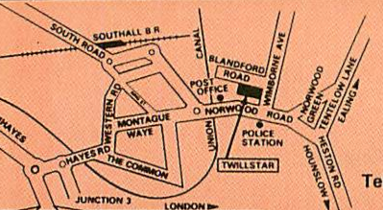
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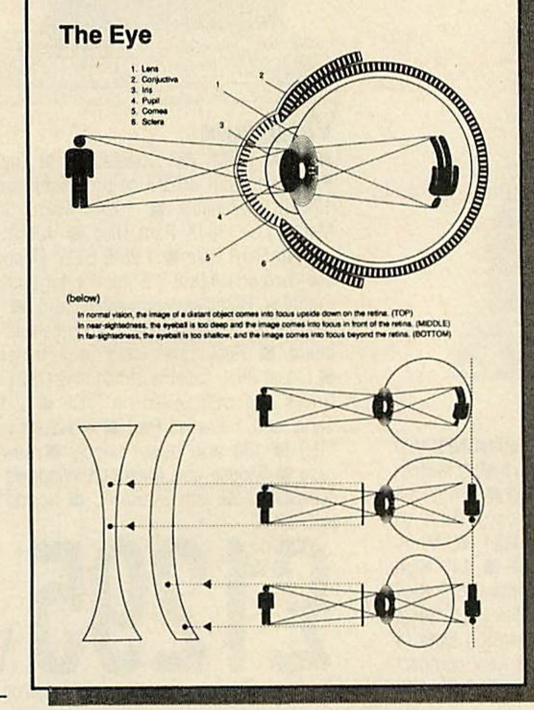
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Appendix 1
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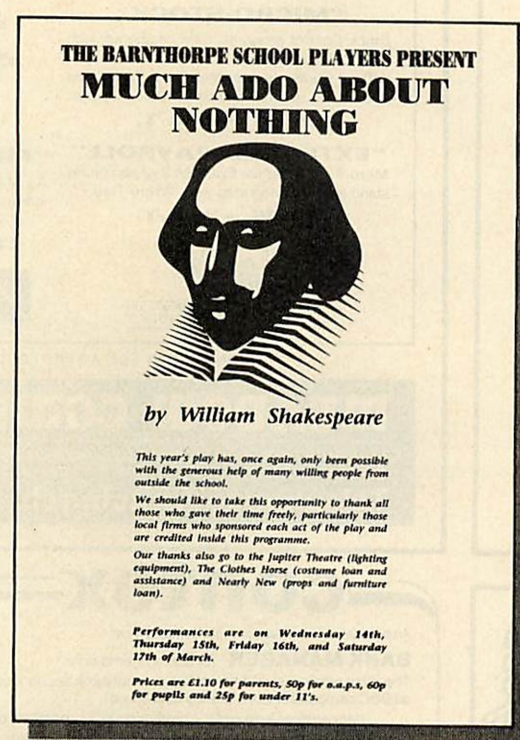
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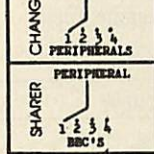
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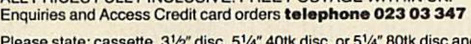
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1. Winchester Unit–(winchester drive, controller boards, power supply and fan all fitted in one compact case). The fan is recommended in order to keep the winchester at the correct operating temperature.
2. Master Reference manual part 1 (for a BBC B or B plus you will require the Acorn ADFS ROM and utilities available at an extra cost).
3. Winchester user guide.
4. Additional utilities on the winchester including formatter, verifier, ADFS menu and backup program.

PLUG IN SECOND DRIVE

The Acorn ADFS can handle up to two winchester drives. These are accessed as drive 0 and 1 (the floppy disk drives being accessed as drives 4 and 5). Viglen winchesters are supplied as Drive 0 (single unit) and Drive 1 (Second drive for single unit). The Viglen drive 1 can be instantly plugged into drive 0 and used either as a backup for Drive 0 (and perhaps taken off and stored away) or for more online mass storage. This will enable you to back up 20 Megabytes in under 7 minutes.

STORAGE OPTIONS:-

Drive 0	Drive 1	Total Capacity
20 Meg	20 or 40 Meg	40 or 60 Meg
28 Meg	28 or 56 Meg	56 or 84 Meg
40 Meg	20 or 40 Meg	60 or 80 Meg
56 Meg	28 or 56 Meg	84 or 112 Meg

COMPATIBILITY?

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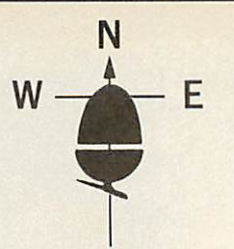
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HINTS & TIPS

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This month's compendium includes advice on copying between formats, and a really useful routine for inverting text

David Atherton

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BLOCK COPY

First out of the postbag this month is a short program from Steven Hankin of Truro. When Steven used AMX SuperArt he was impressed with the block copy facility whereby a rectangle can be picked up from one area of the screen and copied to another area. Steven has written his own program in Basic to produce the same effect. Although the program is slow, it is very short and easy to understand.

The demonstration listing draws a coloured ellipse, then copies a section off to a corner of the screen. The copying is performed by a procedure, PROCcopy, which takes six parameters: st% and stt% are the X,Y co-ordinates at the bottom left of the area to be copied; x2% and y2% are the top right co-ordinates in that area; and x1,y1 are the bottom left co-ordinates of the area to which the copy is to be made.

Steven points out that the program can be modified for interesting effects. The loops within the procedure can be changed, for example:

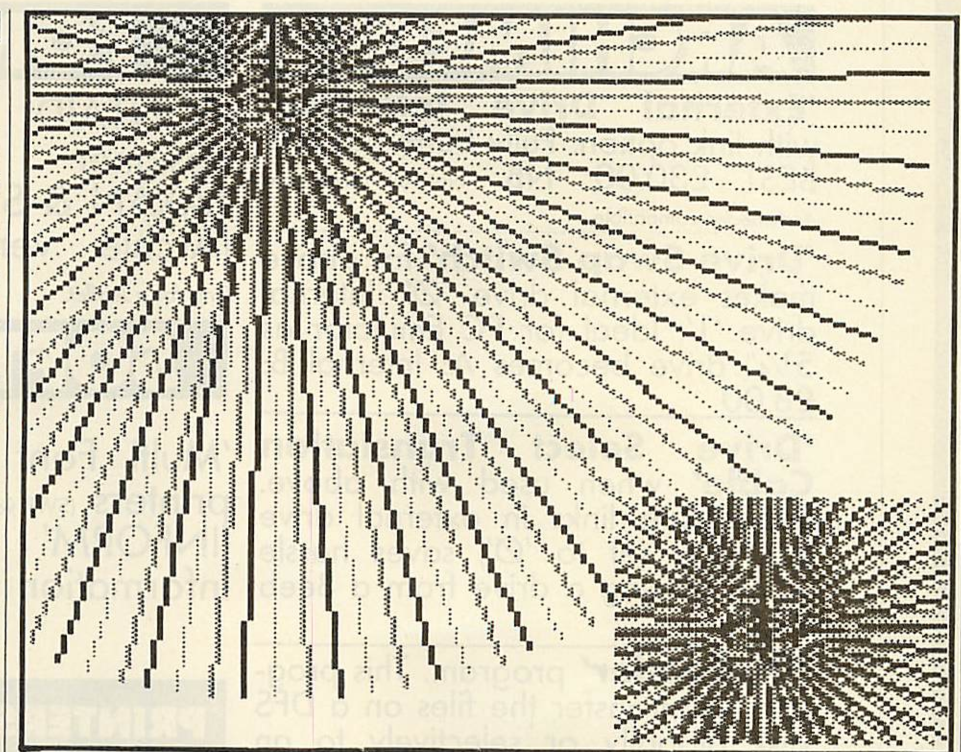
FOR y%=y2% TO stt% STEP-4

will flip the image from left to right, and:

FOR x%=x2% TO st% STEP-4

will mirror the image upside down. Changing both lines will produce a complete inversion in both planes.

The step of four in the x% loop should be changed to two for copying in Mode 0, or eight for Mode 2. The y% step remains the same in all modes. The program works only in graphics modes.



ProcCopy works in graphics mode, but will handle text as well

*COPY *BACKUP

Many readers have written to me expressing difficulty with the various disc formats used by the BBC and Master. The usual problem is that of copying a disc from one format to another. There are 40- and 80-track discs, and 40-, 80-track and switchable drives. Added to this are the complications of the standard and alternative DFS ROMs and even ADFS. Obviously, there are many pitfalls, but this step-by-step explanation of how to perform copies between the various formats may help.

I am considering only unprotected discs here – protected commercial programs generally cannot be copied on to another format. If a protected program uses data files, it will almost invariably use a separate disc for them. These days, most serious software is no longer protected, but if you are using a protected version it might be worth checking with the publisher to see if they have now removed protection and, if so, whether they will update your disc.

The first thing to consider when making a copy of a disc is whether or not the files need to be in a particular order. The first file on a disc is stored in sector 2 (sector 7 in ADFS). The next file is stored in the first free sector after the first file. If the first file is two sectors long (512 bytes), the next file starts at sector 4, and so on. If the files do need to be in order, then a *BACKUP must be used rather than a *COPY, which reverses the order of files (more about this in a moment).

Programs which need files to be in order are those which write data to the disc and expect to be able to increase the length of the file. If the file is not in the right place the program will be unable to do this, and 'Can't extend' message may appear.

No particular place to go

First, let's look at copying a 40-track DFS disc to an 80-track blank disc. Many people buy commercial software in the conventional 40-track format, and then wish to copy it to the 80-track format they normally use. They also want to use the software

with their own data, and by converting the disc, hope to gain an extra 100k of free space.

The problem is, as you may have discovered, that if you format the 80-track disc, place it in drive 1, and the 40-track disc in drive 0, then *BACKUP won't work properly. One of two things will happen: either the backup takes place but the new disc has only 100k of space, as if it were a 40-track disc; or, if you use a more intelligent DFS or disc toolkit, the command just stops with an error message such as 'Wrong size'.

The solution is to use *COPY instead of *BACKUP. Place the master disc in drive 0 and a freshly formatted 80-track disc in drive 1, and type: *COPY 0 1 *.* followed by RETURN. This will copy all the files to the 80-track disc leaving the correct amount of extra space. The *COPY command won't deal with the title and the *OPT setting, so after completion you should check the title and Option and set them on the new disc. You must select your destination drive first. Type *CAT 0 to check the information on the original disc (see figure 1), then *DRIVE 1, as the new 80-track disc is in that drive, *TITLE "SuperProg", the name of the disc, given on the top line, and finally *OPT 4,3. With *OPT 4, the Option number will usually be 0 or 3.

SuperProg (43)
Drive 0
Dir. :0.$
Option 3 (EXEC)
Lib. :0.$

This method is usually completely foolproof and will provide a working 80-track version of a 40-track commercial master. The master disc in drive 0 can be read as 40-track by one of two methods: either switch the drive on to the 40-track setting or, if you're using an Acorn 1770 DFS, use the software switch by typing *DRIVE 0 40. Note that you mustn't use both, as this would create a '20-track' mode!

Order, order

*COPY has the unfortunate side-effect of reversing the order of files on the disc. This can be solved by formatting another 80-track disc, then *Copying all the files from the 80-track disc you have just made to the new one. Again, you will have to set up the title and option string manually.

*BACKUP is, in general, a better command to use, as it makes an exact copy of the disc, including the sectors which are not currently used by any file. Also it is faster, especially if you have a lot of small files, because it copies larger chunks of the disc at each pass.

If you are not worried about obtaining extra space, you can fool the DFS into thinking that an 80-track disc is a 40-track one. Do this by setting your drive to 80-track but, when formatting, tell it that there are only 40 tracks by using *FORM 40 0 (or whatever your formatting command is). The disc will then be formatted to 80-track density, readable only by an 80-track drive, but to the DFS it appears as a 40-track. The drives should then be set up as for the *COPY example, but this time, use *BACKUP 0 1.

The new disc in drive 1 will run as a normal 80-track disc. The reason for this is that the DFS compares the sector count when executing *BACKUP and, if they don't match, refuses to work. By using a 40-track formatting program, the right sector count is written to the disc, so *BACKUP is happy. Subsequent backups of this special disc are also possible because *BACKUP only copies the number of sectors it thinks are present on the disc.

If you have a special DFS, such as those from Solidisk or Watford Electronics which allow double-density formats, you can use the special format with the *COPY method, but you can't usually do a *BACKUP directly from standard density discs to double density.

Single-disc-drive owners can use the above methods only if the drive is manually switchable. Both *COPY 00 and *BACKUP 00 will pause while a new disc is inserted. At these points the drive must be switched so that it is in 40-track mode during read cycles (when the master disc is in the drive) and 80-track mode when writing (when the new disc is present).

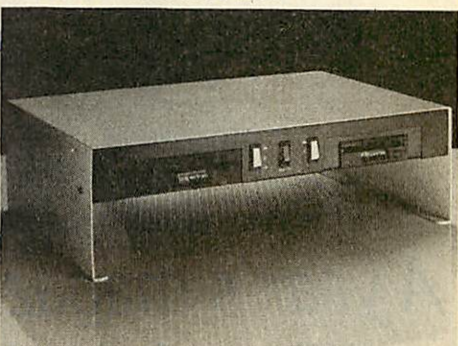
Space doctor

There is a method whereby discs can be copied with *BACKUP and the extra 100k of space on the 80-track drive recovered. However it is more complicated and involves the use of a disc sector editor such as that supplied in *Disc Doctor, Advanced Disc Toolkit,* and some DFS ROMs. The procedure is:

- Format an 80-track disc normally
- Use the sector editor to examine track 0, sector 1
- The top line of bytes will be zeros, except two which show 03 30 (hex). These are bytes six and seven of the sector
- Using the sector editor, change the 03 to 01, and the 20 to 90 (see figure 2)
- Exit from the editor, saving the sector
- Check that the disc has been altered by typing *COMPACT. This should show '18E sectors free', the correct number for a 40-track disc
- *BACKUP onto this disc
- Enter the sector editor again and go to track 0, sector 1
- The bytes will have changed but in bytes six and seven will show either 01 90 or 31 90. Change these to 03 20, or 33 20 if the first byte is 31
- Exit and save the sector

You will now have a full 200k 80-track disc, with the contents of the copied disc on the first 40 tracks and 100k or more free for your own files.

Track : 00 Sector : 01
0000 00 00 00 00 00 00 00 00 03 20 < -change these two bytes
0008 00 00 00 00 00 00 00 00 00 00
0010 00 00 00 00 00 00 00 00 00 00



Hardware switchable disc drives

Copying 80-track discs to 40-track format is less straightforward because you can't guarantee that the files will fit. In general, follow the *COPY routine described above, setting the switches appropriately.

All this presumes that you have genuine 40-track and 80-track drives, or an 80-track unit switchable to 40-track. If you haven't, then a special program is required. Such programs, which will read a 40-track disc in an 80-track drive, are always located in track 0 on the disc. Much software houses releasing software in 40-track format includes a conversion program on their discs: also you will find one on the *Acorn User* disc every month, and it will copy any 40-track disc to 80-track format in a non-switchable drive.

To convert one of your own discs, put an *AU* disc in your drive and type LOAD "COPY40". Then, with a formatted 80-track disc ready, put your 40-track disc in your 80-track drive, type RUN, and follow the on-screen instructions. In a future article we'll look at transferring information from a DFS disc to ADFS format.

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TOPSY TURVY

Garry Smith, from Chester-le-Street, has sent an unusual and interesting routine which turns every text character upside down. The only use for it I can think of is to print text upside down for labelling: if you were using a screen dump to produce a wrapper for a box, for example.

The algorithm is quite neat. After reading &601/&602 to deal with the variable parameter included in the call statement, the program uses OSWORD 10 to read the definition of the character. The definition is stored in eight bytes, each of which represents a horizontal strip of eight pixels on screen. Each byte is reversed so that the least significant bit becomes the most significant, and so on. This is done by the loop containing the ROL and ASL instructions.

At this point the byte is mirror-imaged, but not inverted but this last step is straightforward, as the character definition is still in memory: a VDU 23 command, which redefines the character set, is followed by the reversed bytes.

To use the program, just type it in and RUN it. As long as you aren't in Mode 7 any text printed, including cataloguing, error messages, and so on, will appear inverted. To cancel the effect (which I think you'll want to do fairly quickly!), type *FX20 RETURN.

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ADFS TIP

Chris Royle from Leeds has supplied a straightforward but potentially useful idea for using ADFS. It allows you multiple !BOOT files, each of which is executable on SHIFT-BREAK.

Chris's tip centres on the unusual way that ADFS works when a SHIFT-BREAK (not CTRL-BREAK) is issued. If ADFS is set to a given directory, that directory is 'remembered', the !BOOT file in the $ directory is EXECuted (or *RUN as appropriate). After this, when control is passed back to the keyboard, you are returned to the remembered directory. If the !BOOT file contained the command *RUN PROG, the program is run from the remembered directory, not the $ directory.

The tip is: create a number of subdirectories on an ADFS disc and place a !BOOT file in each one, then create a file called $.!BOOT which merely contains the line *EXEC !BOOT followed by RETURN. Now the !BOOT file in your 'remembered' subdirectory will be executed on SHIFT-BREAK. A number of different !BOOT files may be executed, depending upon which directory is currently selected.

There is, however, a drawback to this scheme. If you are *MOUNTing a new ADFS disc, the current directory will be $, which means that pressing SHIFT-BREAK will cause the !BOOT file to go into a loop, as it continually invokes itself.

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TAPE TURBO

Regular contributor Michael Stirling has submitted an excellent program for tape users which can speed up tape operations by about 30 per cent. The program is a masterpiece of simplicity relying on the fact that the operating system times the leader tones and interblock gaps using a timeout counter which can be altered with OSBYTE 176.

The alterations have to be carried out constantly during save operations, as the operating system keeps resetting the counter. To achieve this, Michael has used a routine latched on to the 'frame flyback event'. If this event is enabled with the machine code equivalent of *FX14,4, then any machine code placed at the address held in &220 and &221 will be executed 50 times a second. Michael's code preserves all the register values before proceeding and restores them all on exit. This is vital to ensure that the interrupted main program does not get confused.

The code should be run before saving a file, whether using the *SAVE command or from within a program. It resides in the cassette file read buffer and is unaffected by saving or by *LOADing, although it must not be present if you are reading a data file. It reduces the interblock gaps in a program to negligible length and cuts out the leading and trailing tones. Because the data is unaffected, the program does not need to be present when reloading the saved files. The listing given turns on the features: it can be turned off temporarily with *FX13,4 and turned on again with *FX14,4.

David Atherton welcomes readers' Hints and Tips which should be sent to him at Acorn User, *20-26 Brunswick Place, London N1 6DJ. Cash awards varying from £5 to £20 are made for readers' contributions to these pages. Programs for publication will be selected by the Editor, whose judgement is final. Programs of more than a dozen lines and with more than a page of text should be sent on disc (any format) as well as on paper. All material submitted to Hints and Tips will be returned to the contributor, and a stamped sticky return-address label is appreciated.*

ARC AGORA

SYSTEM WISDOM

This month's Agora examines system variables, problems with CMOS Ram, and a compact routine to save disc space

Dave Acton

If you've ever used an operating system such as Unix then the Archimedes facility of 'system variables' will come as no great surprise to you.

I suppose we Acorn users have done without these things for so long because BBC Basic has always been available. Perhaps with future implementations of Unix in mind, however, Acorn has finally given in and provided us with OS or system variables. These behave very like Basic's variables, but are fundamental to the MOS and are available to you irrespective of the current language or application.

You may already be familiar with some system variables. Type *SHOW to list all those currently defined. Each is shown in the format 'name : type : value'. For example, the variable 'Alias$LoadType_FED' is a string with value 'Print%0'.

The set of variables beginning with 'Alias$' is used when you try to load or run an unusual type of file. The appropriate alias is searched for and, if found, the value of that string is executed as a command. For example, the alias for a Basic program is called 'Alias$RunType_FFB' and is defined as:

Basic -quit¦"%0¦" %*1

So, when you type *name where 'name' is a Basic program, the above 'alias' command is executed. So that the parameters of any command you may enter may be passed on to its alias, a parameter-naming convention has been adopted. The first parameter is denoted by%0; the second by %1 and so on.

To pass on all parameters, %*0 can be used, and %*1 represents all parameters from the second onwards. In the example above, the name of the Basic program you have tried to run is passed on in quotation marks (the ¦s are to indicate that the quotation marks are to be preserved and not stripped out). All subsequent parameters are then passed on with %*1.

There are several ways of defining a system variable. The simplest is *SET, which merely allocates a string value to a variable name (just as *KEY allocates a string to a function key). For example:

*SET Fred "Hello"
*SHOW Fred
Fred : type String, value : Hello

Incidentally, a variable may be 'forgotten' using the command *UNSET. To define a numeric variable, use *SETEVAL instead. For example:

*SETEVAL Jim 42
*SHOW Jim
Jim : type Number, value : 42

The command *EVAL can also be used to show the value of numeric variables. It will also evaluate expressions which include simple arithmetic. So, using the last example:

*EVAL Jim
Result is an integer, value : 42
*EVAL Jim/6
Result is an integer, value : 7

Should you wish to use one variable in the definition of another, it should be included in angle brackets:

*SET Sheila Jim
*SHOW Sheila
Sheila : type String, value : Jim
*SET Sheila ‹Jim›
*SHOW Sheila
Sheila : type String, value : 42

However, having typed this, changing the value of Jim will not affect the value of Sheila – the value of Jim was evaluated and fixed within Sheila at the time Sheila was defined. To force recalculation, the alternative command *SETMACRO must be used:

*SETMACRO Sheila ‹Jim›
*SETEVAL Jim 123
*SHOW Sheila
Sheila : type Macro , value : ‹Jim›
*EVAL Sheila
Result is a string, value : 123

Note that the type of the value has been converted to a string: it is worth being wary of the types of all your variables because they may be converted in this way.

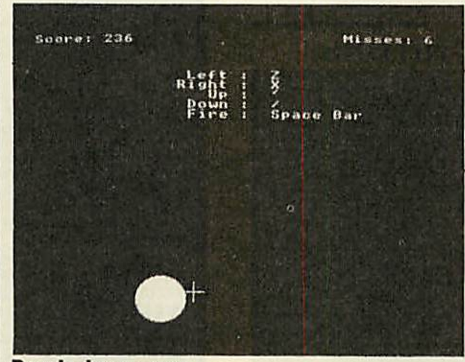
More advanced techniques can use the *IF ... THEN ... ELSE construction which is very similar to its Basic counterpart. The following example counts down from 10 to zero:

*SETEVAL Count 10
*SET Alias$Countdown ECHO ¦‹Count›¦M *SETEVAL Count Count-1 ¦M *IF ¦‹Count›=0 THEN ECHO We have lift off ELSE Countdown¦M
*Countdown

The command *ECHO simply displays what follows. In the example, ¦M is used to separate the parts of the command, and the alias type is used because we wish to issue Countdown as a '*' command. Note the ¦ characters preceding the expressions in angle brackets. These prevent the expressions from being worked out at the time of entry – they're worked out afresh every time *Countdown is used, rather like using *SETMACRO.

I'm sure variables will prove to be quite useful, although with Basic still close at hand it is generally quicker to avoid complicated OS structures and knock up a quick program instead.

However, as a means of passing information between different applications or as a enchancement to *EXEC files, they will surely prove their worth.



Dave's demo game



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Listings 1 and 2 on the yellow pages illustrate one of these possibilities. They use the SWI calls that correspond to the * commands outlined above.

Listings 1 requests the user to specify a set of keys (for use in a game, graphics package and so on. The procedure PROCset performs this task. For each key pressed, two variables are created: one, which is prefixed with 'Inkey$', contains the negative INKEY value for that key; the other, prefixed with 'Key$', contains a description of that key. This description is normally the ASCII code for that key, but with special keys such as Return or Space a full name is required.

The SWI "OS_SetVarVal" is used to define the variables. The first parameter is a pointer to the variable name and as with all SWI calls, if the name is simply a string, the string itself can be used directly as a parameter.

The second parameter is either a pointer to where a four-byte integer is stored (if you are defining a numeric variable) or to where a string is stored (if defining a textual variable).

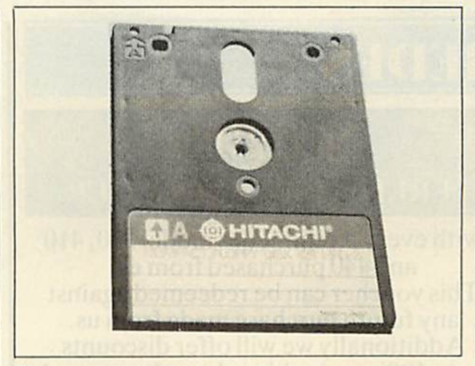
The third parameter is the length of the value being assigned while the fourth is a 'name pointer'. Pointers such as these are required when wildcards are included in a variable name.

The name pointer should be set to zero before making the first call: it will subsequently be updated to point to the 'next match'. The final parameter is the variable type: 0 for a standard string and 1 for a four-byte integer. Other types are available and we'll certainly be seeing them in Agora in the future.

The most important is the "code" type. This allows you to tie a variable to a machine-code program – particularly useful if you want a variable to reflect the status of an attached piece of hardware, for example. In general, such variables are best included in modules so that the module initialisation code defines the variable and the code for the variable is safely installed in the module workspace.

Listing 2 reads the key definitions set up by listing 1 and then uses them in a little game, the quality of which I make no claims for – it is only a demonstration. The rules of the game are for you to deduce.

The SWI 'OS_ReadVarVal' is used first to check if the required variables exist and, if they do, to extract their values. The first three parameters are a pointer to the variable's name, the address of a buffer and the buffer length respectively.

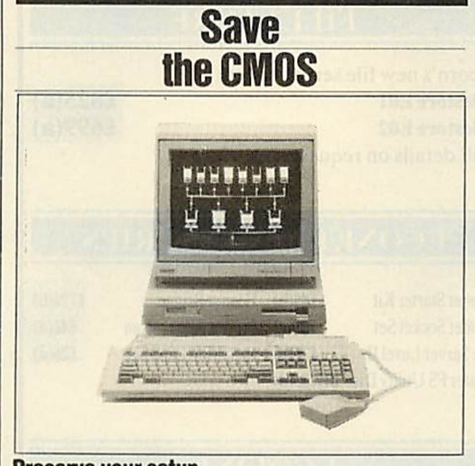


How compact can you get?

To check if a variable exists, the length shuld be set to a negative value: if the value is still negative on return, then the variable was found. Note that the 'X' form of the SWI is used in each case: if the X were not included, the first SWI would fall over with a 'buffer full' error, for example. Having found the required variables, they are read into the block of workspace and their values extracted.

Happy target practice.

£20 Save the CMOS



Preserve your setup

Accidental corruption of the battery-backed RAM is always very annoying. If you own a 305 machine, you may be particularly aware of the problem since many games and applications need to reconfigure the machine in order to operate at all.

Usually, a method for restoring the status quo is supplied but, in case something goes amiss, here is a handy program from P J Dellar of Harpenden in Herts. It appears as listing 3 on the yellow pages. Mr Dellar receives £20.

A utility is assembled and saved as 'ConfigSave'. If you have a hard disc you might like to put a copy in your library. Entering *ConfigSave 'Name' will preserve the contents of your CMOS Ram in the file 'Name'.

What makes the program particularly neat is that the status file can simply be *RUN to restore the contents of the CMOS ram. This is achieved by saving a short piece of machine-code (from .loadcode onwards) at the start of the file.

The contents of the CMOS ram are extracted using the SWI 'OS-Byte' with R0 containing 161. They are restored using the next 'OS-Byte' call – 162. The saving of the status file is performed with a single call to 'OS-File'. This not only saves the data with the appropriate filename, it also stamps it with the file type &FFC to mark it as a 'transient' utility.

So, subsequent running of the file will cause it to be loaded into a spare patch of the RMA (Relocatable Module Area) before the restoration code is called.

£10 More than Compact

A neat little solution to an age-old problem has come from Stuart Turgis of Chesham in Bucks, for which he earns £10. As you are probably aware, the ADFS command *COMPACT very rarely does what you'd expect.

In theory, all the files on the disc should be shuffled together so there is just a single area of free space. However, *COMPACT often gives up before the job is complete.

Stuart's program – listing 4 on the yellow pages – uses the ADFS SWI called 'ADFS_FreeSpace'. The SWI is called with register R0 pointing to the zero-terminated name of the drive to compact. 'ADFS FreeSpace' returns with R0 containing the size of the largest single area of space.

Stuart just issues a *COMPACT by using the SWI 'OS_CLI', calls 'ADFS FreeSpace' and then compares the contents of R0 and R1. If they are the same, the disc is fully compacted – nice and simple!

Stuart's program works perfectly well on hard discs too but be warned: It can take an age to get rid of even a small free 'hole' on the disc.

All submissions to Agora – hints, tips, programs or simply ideas – should be sent to, Agora, Acorn User, *Redwood Publishing. 20-26 Brunswick Place. London N1 6DJ. All contributions will be returned.*

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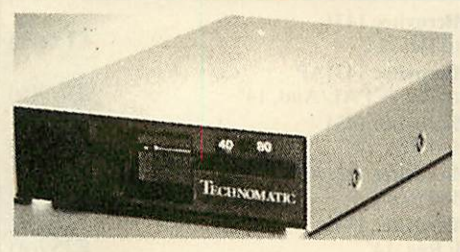
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14" High Resolution Colour Monitor **£209(a)**
Compatible with Master, B, Compact, and PC compatibles

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14" green screen monitor.
This is a new addition to the Philips' popular mono monitors. Features include Flat screen, Reverse video switch, separate brilliance and contrast controls **£85(a)**

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WYSIWYG PLUS

WYSIWYG PLUS is a printer and screen utility for Wordwise Plus, View, Interword, and Basic users, supplied on a 16K Eprom. To obtain a particular printer effect, such as enlarged text, it used to be necessary to discover the appropriate 'printer control code' from your manual and incorporate it into your text. Secondly, you had to print several trial copies in order to position the effect correctly in relation to the rest of your text.

WYSIWYG PLUS simplifies this trial and error approach using easily remembered *commands. For example, *ENLARGED not only selects enlarged text on your printer, but uniquely shows you double width characters on your screen, even from within Wordwise Plus!

WYSIWYG PLUS incorporates a logo editor. Just draw your design on screen using the arrow keys, and save the results. Use the *GRAPHICS command to incorporate your design anywhere in your text; position and see your design in your text before faithfully reproducing a hard copy.

There is also special help for daisy wheel users. The *WHEEL command will prompt you to change daisy wheels whenever a change in type style is about to occur.

WYSIWYG PLUS is designed to work with the following systems:

BBC Model B, 6502 Second Processor, BBC Master 128, All printers (Except lasers)
BBC Model B+, Turbo coprocessor, BBC Compact

WYSIWYG PLUS workspace is relocatable. **£21(d)**

MAYA TERMINAL EMULATOR

A comms package for the professional user. MAYA emulates DEC VT52, VT100 and Tandberg TDV2215. Special BBC VDU mode allows full access to the BBC VDU driver.

Menu driven software allows the setting up of parameters and function key definitions which can be saved to disc for future use.

Flexible command parser provides a uniform user interface and allows full access to * commands and HELP facilities.

Xmodem and Kermit file transfer protocols are included as standard. Unique feature of MAYA is that Kermit can also be used in 'remote mode', which allows file transfers to be initiated by other computers connected to the BBC. File transfers can also be done with a 'dumb' ASCII protocol. Open architecture allows for expansion and addition of new features. Options currently under development are graphics drivers for Tektronix 4010/4014 emulation, TDGR driver for TDV2215 and a Viewdata patch (provisional version included in the current issue). Registered users will be provided with regular updates and customisation service will also be available to those interested.

The package comprises of a rom, utils disc and a comprehensive manual. It is compatible with Master, Models B & B+. It supports DFS, ADFS, NFS and ANFS filing systems. **£49(d)**

BLACK QUEEN

A contract bridge program from BBC Publications both for beginners and for club players. Features include rebid and/or reply of any deal just played. Deals can be saved to a disc. Unique feature of Black Queen is its ability to construct deals from standard or classic ones in newspapers etc.

Compatible with Master, B and B+ **£13(d)**

EDUCATIONAL/FUN SOFTWARE BUNDLE

Wordmover, Drawstick, Wordplay, Pantry Antics, Locomotion

These programs are supplied from the BBC Publications Educational Software range and will be supplied on a 5.25" disc for BBC Master, B+ and B and on a 3.5" disc for the Compact.

5.25" Disc £17.50(d)
3.5" Disc £18.50(d)
(Normal RRP over £40)

VU-TYPE

Do you have finger trouble when typing?
Do your letters look like this?

Dear Sor,
I wuold like to...

then you need:

VU-type, a complete touch typing program produced by BBC/Pitman.

It allows you to learn at your own pace and has a wide range of exercises. Screen displays show the keys you have pressed and it will report on your speed and accuracy.

Supplied on a 40T Disc with a manual.

Available at a special price of £7.50(d) instead of the usual £15. Offer valid while stocks last.

BISMARCK

An enthralling game of strategy involving the famous German battleship of the same name.

You can play the role of British Navy in its quest to find the Bismarck and sink it or take either British or German role against another player. It requires the highest qualities of judgement, observation and decision to plan strategy and tactics to plot the death of Bismarck. **£13(d)**

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8143 RS232 .... £30 (d)
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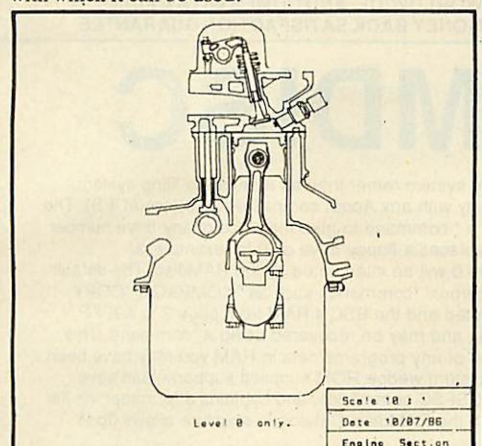
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Novacad can drive a plotter to produce drawings of highest quality... Novacad is excellent. It is flexible, genuinely easy to operate without much practice, and a pleasure to use. **Beebug Dec 86**

A sophisticated CAD package with unique facilities. Thousands of Novacad packages are being used in widely differing fields ranging from industries for producing engineering drawings to accountants offices for producing flow charts. Architects, engineers, plumbers, kitchen planners and many other professions requiring easy to use facilities for producing high quality output are making extensive use of Novacad's unique features. Novacad is proving to be an invaluable teaching aid in technical schools simply because of the ease with which it can be used.



Novacad is compatible with all models fitted with Acorn DFS. Hardware requirements can be minimum; single drive and FX80 compatible printer are enough to get started, though its performance is enhanced considerably by use of 6502 2nd processor, dual drive and to a degree with B+ and Master's shadow ram.

The major features offered are:

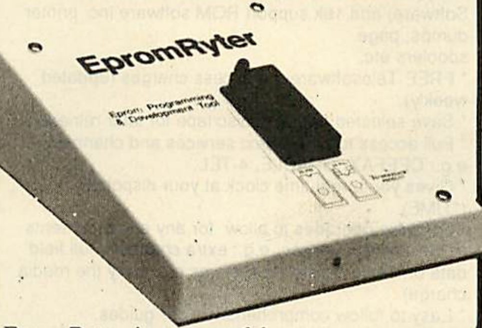
- ★ Simple and easy to use with logical command sequence.
- ★ A large drawing area (approx 15 screens)
- ★ Unique ability to create complex icons made up of upto 500 lines instead of the usual 15 to 20 pixels, store them in a library and recall them at different scales and orientations.
- ★ Zoom facility.
- ★ Create multi level drawings.
- ★ Text entry at any 90° orientation anywhere on the screen.
- ★ Grid scaling and locking, displacement measurements.
- ★ Printer routine for FX80/100 compatible printers
- ★ Cursor control from keyboard/tracker ball/ mouse.

Plotter driver generator available as an optional utility, configures a routine for any BBC coompatible plotter. Pre configured routines for popular plotters like Epson HI80, Hitachi, Plotmate are included. Drawings can be scaled to maximumm plotter size.

NOVACAD T/M Version	**£49(d)**
NOVACAD T/M + Plotter DG	**£61(c)**
Plotter Driver Generator	**£15(d)**

EpromRyter

***Highly sophisticated & Advanced Programmer**
***All current single rail eproms handled**
***State of the Art Programming Algorithms**



EpromRyter is a powerful eprom programmer designed for use with the BBC Master Computer. It takes full advantage of the latest developments in the eprom technology and the extra facilities on the Master to provide fast, simple and efficient programming and editing facilities.

The software is totally menu driven and on screen help messages make the programming simple for both specialists and novices alike.

The EPROMRYTER interfaces with the Master through 1MHz bus. It is mains powered with its own psu. 3M Textool zif socket has been fitted to ensure consistent and reliable service over long periods.

The single rail eproms handled by the EpromRyter are:
- 2716 2732 2764 27128 27256 27512 27513 27011 2516 2532 2564 (NMOS & CMOS)
- One time eproms P27XXX, 87CXXX etc.
- Also A suffix eproms such as 27XXXA

£89(b) + VAT

META Ver III ASSEMBLER

"All the good features you would expect to find in a good source code editor are present ... Meta assembler lives in a different world. It is structured to work with any new processor ... as new instruction sets can be added ... as needed ... has a well featured editor with colour highlighting, a sound modular approach." **Acorn User October 1986**

- Assembles for over 30 popular processors, including Z80, 6800/01/02/04/05/09/11 etc – and 68000 – using native mnemonics for each processor, eg LD A, (HL) for Z80 and MOV A0, $1000 for 68000 etc.
- Fully integrated Editor: four field, all search, search/replace, block copy, delete, move, marked save, load etc.
- Compatible with Portal Eprom Emulators and Team Disassembler.
- Send object code in Intel Hex, S-Record, straight binary etc. down to discs, RS232, parallel port, Eprom Emulators etc – all **during Assembly.**
- Over 50 directives included as standard: handling nestable macros, conditional assembly and twenty types of table definition directives.
- 32 bit labels; 31 character names. Arithmetic and Boolean arithmetic to 32 bits.
- Modular source code with numeric and string parameter passing.
- Serial communicator area with eight options lines: echo, control code trap, LF suppression/ addition etc.
- Over 500 in use throughout the world in universities and many different industries.
- Two 16K Roms, two 80 track discs, A4 ring-bound manual, function-key strip.

£145(b)

EPROMER II

A proven Eprom programmer for BBC Model B and B+ with thousands in use in industry, educational and R&D establishments. It offers many of the powerful features of the EpromRyter and can program all single rail eproms upto 27256. Full details on request. **£89(b)**

PORTAL EPROM EMULATORS

- Emulates 2716, 2732, 2764, 27128, 27256, 27512 eproms at 150ns Access time.
- Load at 4Kbytes/second – No "erase" time.
- 28 pin header plugs into Eprom socket on target system – status monitored on 13 Leds.
- Fully software controlled from Meta Assembler.
- 100 times faster than standard EPROM program/erase cycle.
- Fully CMOS compatible; draws no power from target system.
- Four portals may be independently programmed off same user-port cable.
- Complete with all cables, manual and disc.

PORTAL 512 (2716, 2732, 2764, 27128, 27256, 27512). **£245(b)**

TEAM DISASSEMBLER

The third part of the Universal Development System: a Meta labelling disassembler.

Supports 1802, 8080, 8085, #HD64180, Z80, 65XX (includes 65 col, 6511 etc), 68XX (includes 00, 01, 02, 03, 08 etc):

- Up to 64K of object code translated back into META compatible source code modules: labels automatically inserted on all jump targets, memory references etc.
- Pre-editing stage allows marking of object code areas as byte, string, word, long word etc, tables. These areas disassembled into appropriate directives instead of garbage mnemonics.
- Reconstituted source code ready for immediate re-assembly by META.
- Omniversal search/repalce for re-naming arbitrary label names with meaningful ones.

£145(b)

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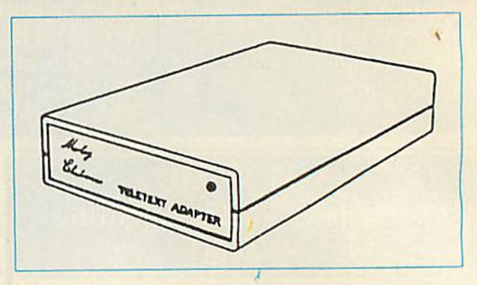
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TELETEXT ADAPTER

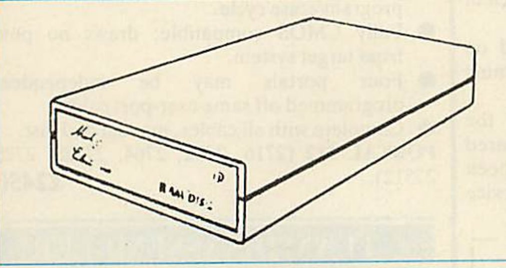


Would you like access to free high quality software and over a thousand pages of information, but Prestel access charges and phone bills too expensive? Then read on!
The answer is Teletext. Yes the same system everyone has seen incorporated into television sets, but with a difference. When Teletext is read by a computer you can actually use the data.
The MORLEY TELETEXT ADAPTER introduces you to the world of Teletext at a price that won't break the bank. Inside it you will find the latest in second generation Teletext chip technology, which unlike our rivals who are still using chips designed more than ten years ago, will be fully compatible with any future advances in the Teletext system.
With the Morley adapter you will get a state of the art unit that automatically tunes itself into the required station (no more messing around with screwdrivers or twiddling little knobs in the back of the case), a user friendly menu driven program, easy to follow instructions and a 12 month warranty. Add to this the free downloadable telesoftware and we are sure that you will agree that we are offering you one of the best bargains on the market today.

FEATURES:
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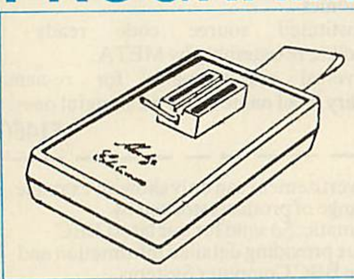
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This device was designed and manufactured jointly by Morley and Care Electronics.
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ALL CARTRIDGES COME WITH A 12 MONTH NO QUIBBLE WARRANTY

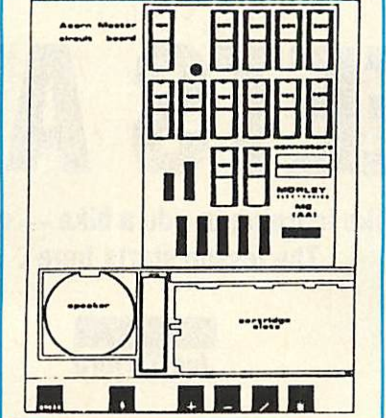
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At long last the add-on all MASTER users have been waiting for, an internal ROM board.

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The new **MORLEY MASTER BOARD "AA"** allows you to have up to 8x16k and 4x32k extra Roms installed inside your MASTER and still leaves the cartridge slots free. This in effect allows your MASTER to support as many as 24, 16k ROMs installed permanently, whilst retaining the standard 4 x sideways ram banks and four banks by using cartridges





A staggering 32 ROM images installed and accessible at any time

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SHEETS AWAY!

Using a spreadsheet is like learning to ride a bike — once mastered, never forgotten. The lesson starts here . . .

Joe Telford

A spreadsheet is a computer program which allows us to tabulate numbers and formulas, in almost any format we want to use. We can add labels like 'January' or 'Rainfall' and then print out the end result for further thought. The really clever thing about spreadsheets, though, is that if you change a number in a box, and that box is part of a formula somewhere else in the spreadsheet, then all the boxes that are related to the changed slot are also changed.

Hence a spreadsheet replaces a very large sheet of paper, a powerful calculator and 250 bottles of Tippex. And while the action of the human on her sheet of paper would be measured in alterations per hour, the spreadsheet program works in alterations per second. Add to this the extreme accuracy of the spreadsheet program, and the inherent neatness of computer text, and you can quickly see why the spreadsheet has become such a major numerical management tool in all walks of life.

The vocabulary of spreadsheet words is self-explanatory. The only thing to watch is the terms 'cell', 'slot' and 'box', which all mean the same thing – a space on the spreadsheet containing a number, formula, or text.

Using spreadsheets

To many people, the word spreadsheet means *Viewsheet* or *Multiplan* or any one of a dozen proprietory sheets for the full range of computers. And for many, the time they spend learning about a specific spreadsheet is often abnormally large, with the learning focussed on problems which they actually have to solve. Many folk seem to feel that they need a simpler introduction to spreadsheets, on the ground that the basic skills can be transferred to any sheet, once they have mastered the elementary functions.

With this in mind I sat down to design a spreadsheet for this column, which matched the key criteria of:

- Being simple to use
- Having a small enough display to avoid becoming lost
- Containing full prompts for all actions
- Embodying the key elements for all spreadsheets.

A short study of teaching examples for spreadsheets showed that 95 per cent of examples fitted in a 20 by 20 grid, and so this spreadsheet was set at 25 by 25. This means that at any time the complete depth of the sheet will always be on screen. Although only four columns can be viewed at once, the remainder can be seen by scrolling horizontally. Also with typical training examples, the vast majority of applications were financial, and in this context the width of each cell could safely be fixed at nine characters, with two decimal places. This gives the screen display shown in figure 1, which allows several lines for prompts and other informative messages to the user.

Specifications

The specifications for our introductory spreadsheet are derived from the above criteria. Now that we have sorted out our requirements we can split the specifications into five headings:

- How to communicate with the sheet?
- How to represent information on the sheet?
- How will the sheet interact with the filing

ILLUSTRATION BY AXEL SCHEFFER

system?

- How will the sheet provide hard copy?
- What other facilities will be useful?

Unlike many spreadsheets which are command driven, an introductory spreadsheet should have all its commands clearly available all the time for the learner. This is achieved by using the red function keys, sometimes in association with the Shift key, to issue commands. Moving around the spreadsheet is accomplished with a cell cursor, which moves in response to the BBC cursor keys. Whenever a command (red) key is pressed, that command acts either on the whole sheet or the slot where the cell cursor is positioned. This sheet should not have a 'command mode' because, in the early stages of learning about spreadsheets, such modes are confusing.

Messages explaining what to do for each command, what the system is doing at any time, and what problems have occurred should pop-up in the message space and as far as possible (given memory limitations) such messages should be tutorial.

Representing information

The three types of information are: text, numbers and formulas. It is particularly important for beginners to separate these and to identify them at a glance. To do this, we colour-code text as white lettering, numbers in red, and formulas hidden but shown as yellow numbers. This means that we need to use screen mode 129, and this is why this program is specified as Master/BBC B+ compatible (and guess what: it runs on the Arc!).

There is also an unenforced user criterion that numbers should be limited to eight figures including decimals and minus signs. This gives an effective range of -9,999,999 to 99,999,999 in any one slot, which covers the financial needs of many small businesses. Going outside this range can change the screen layout, but there is a simple of way of taking account of this.

The four main filing tasks should be catalouguing a disc, saving a file, loading a file, and deleting a file from disc. These tasks should be self-explanatory, once invoked. The internal organisation of the spreadsheet (it uses both a text and a numerical representation of data) will be a major parameter in specifying the time taken to load or save a spreadsheet.

In addition, the spreadsheet should work on any currently selected filing system, eg. ADFS and NFS, although with these, directories S and N need to be created.

It is important for beginners to be able to print out both the finished spreadsheet and the contents of the slots, including formulas. Both facilities are included in this sheet.

Because of the time taken for recalculaions, it is best to be able to turn automatic recalculations on and off, and also to be able to recalculate at the push of a key. These functions are provided in our spreadsheet. It should also be possible to perform simple replication around the spreadsheet. Another set of useful facilities should allow the sheet size to be altered by inserting or removing whole rows and columns. Unfortunately this will require us to redefine any formula on the sheet, because we cannot guarantee that the change does not affect them. It should also be possible to delete the contents of a slot with a single keystroke, and exciting the program or creating a new sheet should be done similarly.

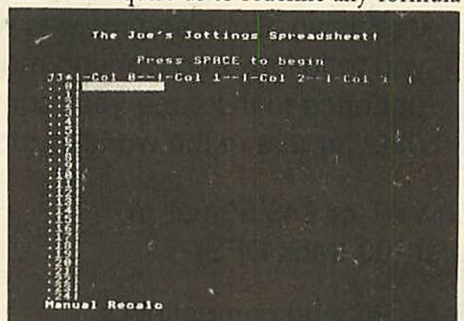


Figure 1. Screen display, with space for prompts

Installing the spreadsheet

Figure 2 is a full-size overlay for the function keys, and it contains all the commands available. Because the program is so large, be very careful in typing it into memory. If you can afford it, the *Acorn User* Disc of this issue will give you the whole 15k without errors, and is probably a safer way of getting the program running. Once the program is entered, then save it on disc, as "SPREAD", before anything unforeseen happens. I would recommend a whole disc for this program, which should then allow you to save 15 spreadsheets in DFS, 47 in ADFS and hundreds in INFS.

If you are using NFS or ADFS, create in the same directory as "SPREAD" two extra directories S and N. S is for files holding the text and formulas for the spreadsheet, while the N directory is used for files which hold the actual numbers.

Once this is all set up, the next stage is to build an autoboot file. This can be done as follows:

```
*OPT4, 3
*BUILD !BOOT
0001 MODE 129
0002 CHAIN "SPREAD"
ESCAPE
```

Now whenever we press Shift-Break the SPREAD programs load and runs, giving a welcome message and asking us to press Space to start.

Using SPREAD

We'll start by looking at the different commands available, then move on to a couple of worked examples.

Press the cursor keys at random. You'll see that the white cell cursor moves in the direction of the arrow key pressed, unless it comes to an edge of the sheet. Use the CTRL key with the cursor keys to jump quickly to the left and right sides of the sheet and from top to bottom. Notice that when we jump left and right, only the column headings seem to change. We must remember that the sheet is written in Basic and so functions like redrawing the screen take a little time.

The Shift key in conjunction with the cursor keys move the cell cursor four slots at a time. This is easily seen moving up and down the sheet, but moving left to right it seems that only the column headings change. It helps to think of the spreadsheet as a long roll of paper which we can pull through a viewing area (the screen) in windows of four columns by 25 rows, as shown in figure 2. It is very easy to turn figure 2 into a learning aid by making the 'viewing screen' from thick card, and feeding the spreadsheet through the slots so that at any one time only four columns will be 'on screen'. A lot of initial spreadsheet learning can be performed in the first four columns, because people tend to think in terms of totalling columns rather than rows of numbers.

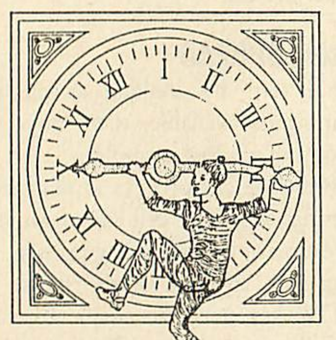
A useful learning task is to work with a friend and take turns to move to selected cells, then back to the first or last cell of the sheet. Use the Shift and CTRL keys to develop speedy control over the cell cursor.

Cell references

This spreadsheet is based on a large data structure in Basic called an array. It extends from element 0 to element 24 (25 elements) in the X or horizontal direction and from element 0 to element 24 (25 elements) in the Y direction. We can specify any cell, and hence any array element, by writing A (X,Y) where A is the name of the number array on the sheet, X is the column across the sheet, and Y is the number down the sheet of the row containing the cell required. So A (4,10) is the cell at the intersection of column 4 and row 10. Where

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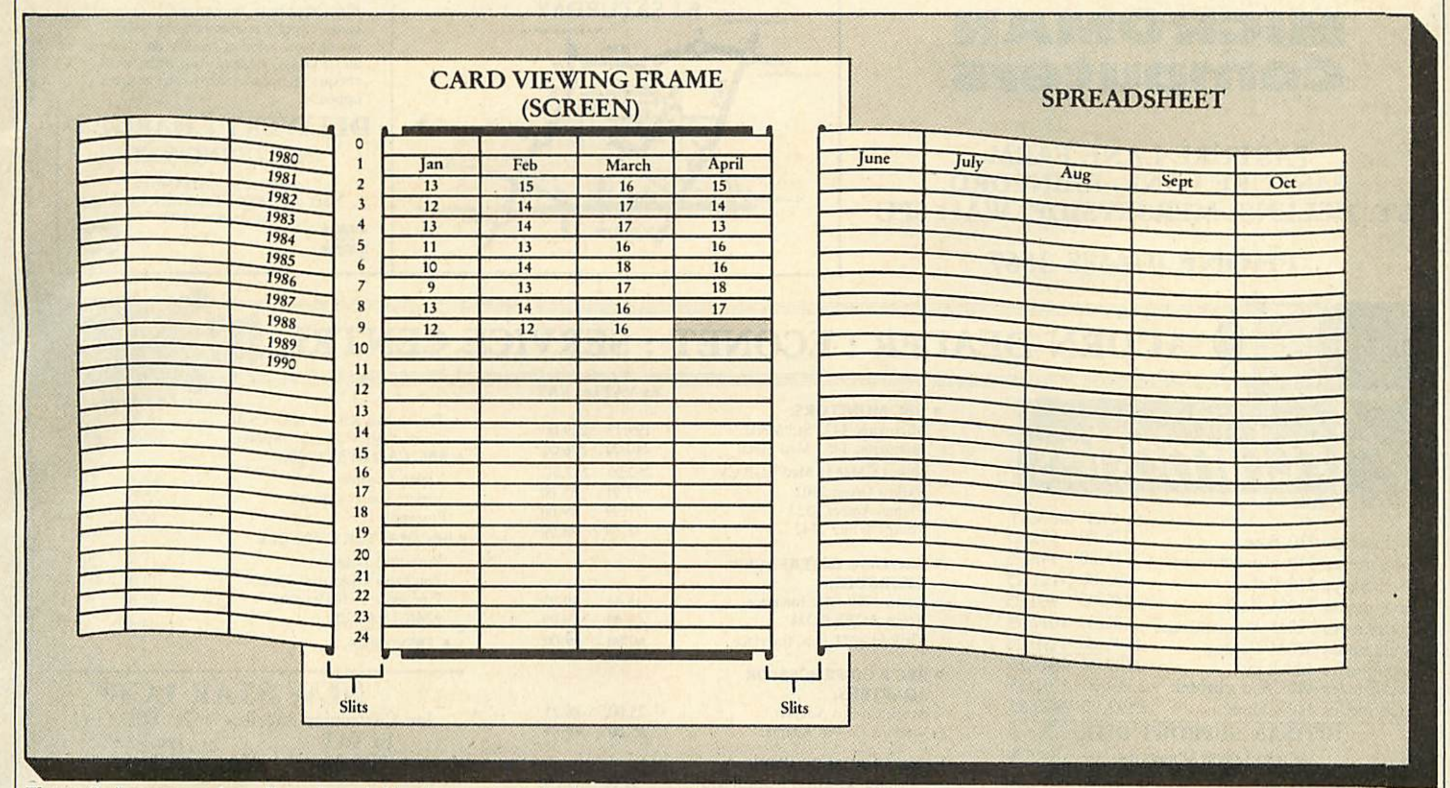


Figure 2. A paper and cardboard model to demonstrate horizontal scrolling of the spreadsheet

do you think A (0,0) is? Where do you think A (9,5) is?

Entering information

Information can only be entered into the current cell, so move first to cell A (0,0) and press f 0. A line of dots fills the cell and you can type up to nine letters. Type MONTH and press Return. If you make a mistake before pressing Return, just delete the mistake with the delete key and then retype. If the mistake is only apparent after pressing Return, then just move back onto that slot and press f0 to re-enter the word. Now put these words in:

A (1,0): Sales
A (2,0): Cst/itm
A (0,1): Jan
A (0,2): Feb

Now move to A (1,1), opposite Jan and press f1. A red bar will appear, filled with dots. Type the number 52 and press Return. The cell cursor will turn white, and move down leaving a red number 52 behind. Again, a mistake can be dealt with as shown above. Now put these numbers into the slots:

A (2,1): 22.5
A (1,2): 46
A (2,2): 22.4

We now have sales figures and items cost for January and February. To find the total cost for January and February we have to multiply the sales figures by the item cost for each month. To for this move to A (3,0) and enter the column heading 'Tot cost'. Now move down to (3,1) and press f2. A message appears asking whether you want to enter a formula. You answer by pressing Y. The message 'Formula :=' appears in the top left of the message window and you are ready to enter our formula.

At this point you could type 52*22.5 and press Return. This would be an acceptable formula, but when the figures change next year, you would need to alter it. You can get around this by typing in slot references. This formula A (1,1) * (2,1) would achieve the same result, and could be manually typed. But there is a better way still: simply use the cursor keys to move to the 52 in slot A (1,1) and press the Copy key: the slot reference will go into the top left corner of the message area. Now press the * key and it will be added. Now move to the 22.5 of slot A (2,1) and press the Copy key again. Finally press Return: the result of 52*22.5 will be placed into slot A (3,1) and the cell cursor will readjust its position, leaving cell A (3,1) with a yellow number. Whenever we move the cell cursor over a yellow number, its hidden formula will be shown at the top of the screen.

Formulas can be quite long, and hence are often difficult to follow. Make sure that any formula you enter does not exceed the space available in the message area.

Formulas can be made more complex by the use of functions available in Basic. For example you could type:

SQR (A (2,2)^2+A (2,3)^3)

which would be an acceptable Theorum of Pythagoras formula. Or

PI * A (3,4)^2

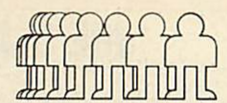
for the area of a circle. Note that the SQR and the PI*, etc have to be normally typed, before the slot references can be added by the copy-reference method.

Mistakes in formulas

If we spot a mistake in a formula before pressing Return, simply use the delete key to cancel it, then rebuild the formula from the mistake. If we don't spot the mistake, three things could happen:

- The formula could evaluate to an incorrect number and we'd never know. The moral is check your formulas carefully.
- The sheet could attempt to evaluate a division by 0. If this ever happens the computer will beep and generate the number 999, 999, 999 which should remind you of a problem. In the situation where we've just written the formula, we also get a 'Can't divide by 0' message in the message area of the screen.
- The sheet could attempt to a evaluate a faulty formula, for example A(1,1)*. This would end in a fatal error, but the sheet traps it and places the text message '?Formula?' into the cell. The message overwrites the faulty formula, which is lost.

The other problem is one of a formula generating a number which is too big for the computer. This is trapped and replaced with



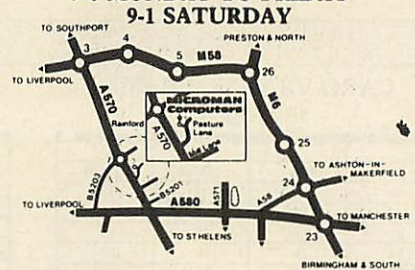
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'Too big'. In some instances numbers will be generated which need more space than the columns allow. They will be truncated whenever possible so that the most significant numbers show. The whole number appears when the cell cursor is moved over the number, but this is at the cost of losing the information in surrounding cells. A forced recalculation (Shift-f1) will normally tidy the screen, but this spreadsheet is not intended to handle large numbers.

Manual and auto recalculation

The program begins using manual recalculation. In other words, whenever you add numbers or formulas you should press Shift-f1 to force a recalculation. This is so that a large sheet can be entered without continual recalculation on every input (even text inputs). Once the whole sheet is set up, then a Shift-f1 will provide the correct values and thereafter Shift-f 0 will guarantee that any changes are automatically updated, without the need to press Shift-f1.

Order of recalculation

When a recalculation is performed, the formulas are used in each row in turn, from left to right. This means that there is an implication for the way in which we enter data into the sheet. For example, if a formula in cell A(0,5) relies on data generated by numbers or formulas in cells A(0,1) and A(24,4) then the chances are that the formula will evaluate correctly, because both cells are evaluated before cell A(0,5). If the cell depends on a number or formula which is evaluated later, then its evaluation could be incorrect, and at best a second manual recalculation might be useful. You should therefore make sure that all formulas which refer to numbers and to other formulas are either below those formulas or on the same level but to the right.

Inserting and deleting

The Shift keys with the function keys f3, f4, f5 and f6 allow us to insert or remove rows and columns, but any formulas will be lost. This is a small price to pay, because most layout problems become evident soon after you begin to build a sheet. They are often the result of poor planning. Let's insert a row in our sales spreadsheet: move to cell A(0,1) marked 'Jan' and press Shift-f4. A message asking if we want to insert a row appears and we can press Y. After a short wait the extra row appears, but the formula in A(3,1) has moved down into A(3,2) and has become replaced by '?Formula?'. It has to be redefined.

Although inserting columns works the same way, and deleting rows and columns actually closes up the spreadsheet, the delete slot command, Shift-f7, only deletes the slot contents; it does not remove the slot.

Filing

Pressing f4 at any time catalogues the current disc, concentrating on the S directory. Anything in here should be a loadable or deletable file. The Space bar returns us to the spreadsheet, and f5 allows us to save the spreadsheet to directories S and N. When f5 is pressed, a message asks us for the filename: we simply type a filename of up to seven letters and press Return. After a while the files will be saved. If a problem arises – such as a full disc or full catalogue – or if a file already exists with the same name, we will be informed and we can take appropriate action.

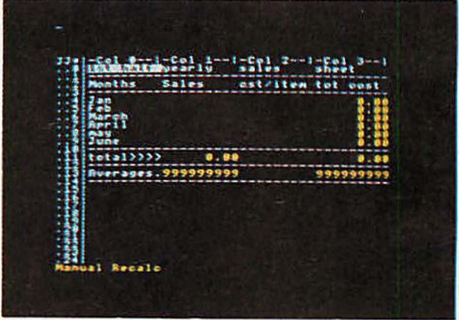


Figure 3a. Initial spreadsheet

The f6 key lets us load a sheet which we have previously created. The procedures are the same as those initiated by pressing f5, and once more, messages keep us informed of progress. Key f7 allows us to delete files on disc, and again messages keep us informed of what is happening. With all these keys, simply pressing Return will show a catalogue of the disc and Space will return us the entry point, so we can type in an appropriate filename

Restarting the sheet

Occasionally we will find it easier to restart the whole sheet than to delete everything and set up a spreadsheet again. To do this we press Shift-f 9 and answer the following message with Y. The program will restart after a while.

Pressing f 9 by itself issues a 'Do you really want to end?' message. Pressing Y at this point will return us to Basic.

Printing from the sheet

This is a fundamental necessity of any spreadsheet program, and this training spreadsheet allows printing in two ways. First, press f8 and follow the instuctions to move to the bottom right corner of the area of the spreadsheet that you want to print out. Now press Return. A message asks you to decide whether you are printing out the spreadsheet or its contents. Choose S to get a hard copy of the spreadsheet as it looks on screen. Choose C to get a long list of the contents of each cell in the sheet. Once you have chosen, follow the rest of the instructions for setting up your printer: then the sheet is printed. On a typical dot matrix printer the sheet is printed in condensed text, so it displays 13 cells per line, and the whole spreadsheet is printed in two passes. The end result can be cut and stuck together if necessary.

The spreadsheet option has two printing facilities either to draw lines between the columns or to leave columns open. This is offered by yet another message.

The contents option is also printed in condensed text, and provides a useful way of demonstrating how the sheet is built up. A useful task is to cut and paste the contents printout so that it resembles the spreadsheet, but beware of very long formulas.

The condensed text is produced on an Epson printer using a line beginning VDU2,1,15,3. The value 15 tells the Epson to condense text. If your printer doesn't use that character, then the appropriate one will need inserting at the correct point.

Replication

This is a major aid for quickly assembling spreadsheets. Replication is a time-saving tool, rather than an essential: it is the means by which one area of a spreadsheet can be copied to another area, sometimes with automatic alterations. I will explain replication by referring to a simple spreadsheet which is incomplete. The initial sheet is shown in figure 3a. It is an extension of our sales sheet for the half year.

Figure 3a is the bare skeleton of the spreadsheet. The first stages are to put in row lines right across the spreadsheet and to copy the month names into that last column (column 5). First press f3, the Replicate key. The messages which now appear are very important, so you should read them carefully. First move to the start of the replication area and press Return. Do this by moving to cell (0,1) which contains '————' and press Return. Then move to the end of the replication area and again press Return.

Now move to the begining of the area you are copying into. Simply move one column right and press Return. Next you have to find the last slot in the copy area, cell (5,1) at the end of that row. Press

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Meeting the P.M.	Waiting to see "M"

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	Recalculate			Insert		Delete				
+Shift	Auto/ Manual	Force		Column	Row	Column	Row	Slot		New sheet
	Enter				Filing system					
f-key	Text	Number	Formula	Replicate	Cat	Save	Load	Delete	Print	Exit

Figure 3. Use this diagram to create a function key strip

Return, then a message has to be answered with N. After a few seconds the complete line of '———'s is entered, and you are ready to repeat the task for row three.

You are still in cell (5,1). Press Replicate then Return twice to mark the source slot. Now move down to (5,3) and press Return, then use CTRL and left cursor to get to the start of row 3. Press Return again and answer the formula message with N, then that row will also be filled. Repeat this in rows 10, 12 and 14. To copy the list of months, follow these intructions:

- Press replicate
- Move to (0,4) — Jan — and press Return
- Move to (0,9) — June — and press Return
- Move to (5,4) — start destinations — and press Return
- Move to (5,9) — end destination — and press Return
- The row will be copied

Note that a row or column can only be copied without formulas, while a slot can be copied to a slot, row or column including formulas. These formulas can be amended as we will shortly see.

You are now at figure 3b and the next stage is to enter the key formulas. This is done without any replication as follows:

- Move to (3,4) and enter the formula: A(1,4)*A(2,4)
- Move to (4,4) and enter the formula: SGN (A(1,4))
- Move to (1,13) and enter the formula: A(1,11)/A(4,11)
- Move to (3,13) and enter the formula: A(3,11)/A(4,11)
- Move to (1,11) and enter the formula: A(1,4)+A(1,5)+A(1,6)+A(1,8)+A(1,9)

Notice that the formula in cells (1,13) and (3,13) result in 'Division by zero' messages, but this will change when the first numbers are entered. This gets us to figure 3c. The final stage is to replicate the formulas so that the sheet is ready for data entry. Three replications are required:

- Down the 'Tot cost' column so the totals are made for every cell
- Down the 'count' column so that each entry is available for averaging
- Across from the totals row so that the total count (entries made) will be available, as will be the total costs.

Replicating the tot cost column. Move to cell (3,4) – the first total cost worked out



Figure 3b. Lines replicated, months copied

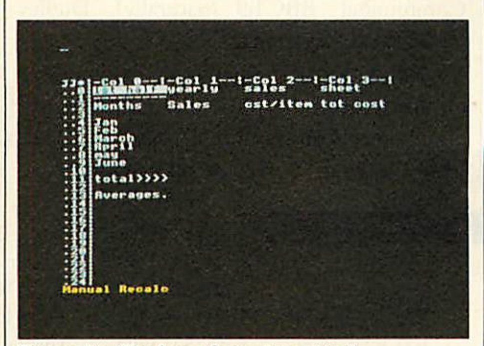


Figure 3c. The base formulas added

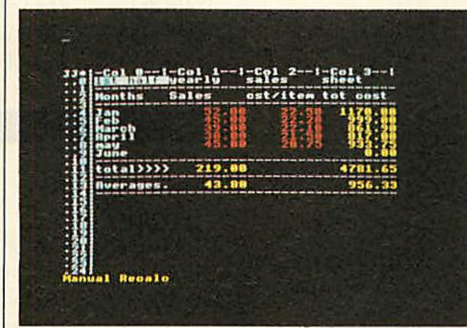


Figure 3d. Ready for data entry

by formula – and press Replicate. Now press Return twice and then move down to cell (3,5). Press Return again and move to cell (3,9), and again press Return: answer 'Alter formulas' message with Y. After a while the column will fill with yellow zeros and you will see the altered formulas generated from slot (3,4).

Replicating the count column Move to cell (4,4) – the first 'count' worked out by formula – and press Replicate. Now press Return twice and then move to cell (4,5). Press Return again and move down to cell (4,9), and again press Return. Answer the 'Alter formulas' message with Y. The column will fill with yellow zeros and altered formulas generated from slot (4,4).

Replicating the totals Move to cell (1,11) – the first column total worked out by formula – and press Replicate. Now press Return twice and then move to cell (3,11). Press Return again and move to cell (4,11): again press Return. Answer the 'Alter formulas' message with Y. The slots will fill with yellow zeros and you will see the altered formulas generated from slot (1,11). The sheet is now at the stage shown in figure 3d.

The replicating facilities are very powerful, but you must remember a few points. First, we can't replicate:

- From a row to a column
- From a column to a row
- From a row, column or slot to a block
- From a block to anything

Secondly, when replicating from rows or columns we must replicate to the same size rows or columns, and we can only replicate numbers and text. Finally, when we do slot replication, and specify formula alteration, then *all* formulas are altered by the same amount. This means that in some instances we will get incorrect answers, for example when a formula is a set of numbers multiplied by a constant number. So A(1,3)*15/100 will find VAT and will replicate correctly but A(1,3)*A(0,0) may not, even if A(0,0):=15/100

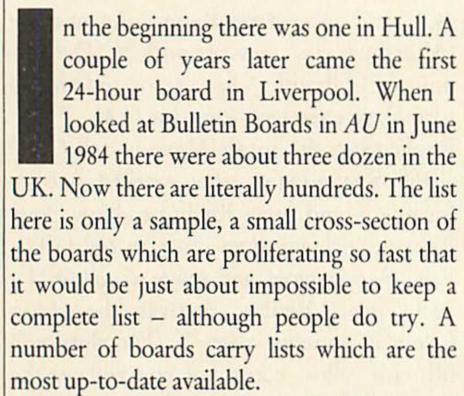
After the framework

Once the framework is complete we can switch on automatic recalculation and enter numbers. I hope in the near future to add a graphics package to this simple spreadsheet. Until then, enjoy your calculating!

BBs HIT THE SPOT

Acorn User's communications special brings you the latest update on Bulletin Boards across the nation

Jeff Ashurst



In the beginning there was one in Hull. A couple of years later came the first 24-hour board in Liverpool. When I looked at Bulletin Boards in *AU* in June 1984 there were about three dozen in the UK. Now there are literally hundreds. The list here is only a sample, a small cross-section of the boards which are proliferating so fast that it would be just about impossible to keep a complete list – although people do try. A number of boards carry lists which are the most up-to-date available.

In those early days most Bulletin Board systems operated only at V21 – 300 bits/sec. Now, however, V23 & V22 are very common, making high-speed modems such as the *Multi-Speed* (reviewed in this issue) not an esoteric luxury but an essential to serious communicating.

While the type of computer used to host a Bulletin Board system is not really very relevant to the usage, it probably does indicate the leanings of the system operator — the sysop. A fair scattering of BBC Beelievers are involved, with BBC micros running such boards as The Gnome at Home (Econet system), Healthdata, Swafax (school board with weather satellite pictures on offer), Communitel, BBCTel (naturally), Dudley College and Merseynet.

One of the most significant developments in the bulletin board world has been the development of the FIDO network. Each FIDO member board, or node, as they are known, functions as any typical BB for most of the 24 hours, but during a preset period early each morning it automatically exchanges messages with other nodes within a tree-structured heirarchy. The result is free access national and international messaging. Responses to your message or query are as likely to come from abroad as at home! Alternet and Family Net are two other networks working on similar principles.

Acknowledgements are due to Phil Burden & Mathew Platts for their excellent Bulletin Board list which was downloaded from sysop Peter Tootill's Liverpool Mailbox, and to David McKendrick of OSL Health Services BBS in Wigan for his useful information.

NB: All BBs operate V21 unless noted.

01 FOR LONDON

Phone	Name	Sysop	Type
(01) 200 3439	Airtel	Adrian Pop	V22,23,22bis
(01) 602 9714	Alice's Restaurant	John Lambert	V23,V23V/data
(01) 404 0897	Brown Bag	Paul Fletcher	V22,22bis
(01) 773 0408	Cabb	Martin Fleming	V23
(01) 249 3238	CBBS London	Steve Adams	V23
(01) 478 5464	Data Connexion	Nadeem Akhtar	V23
(01) 543 7020	Dataflex	Bob Manekshaw	V23
(01) 200 3033	Dec Catt House	Robert Catt	V22,23,22bis
(01) 366 1778	Embassy	Ambassador	V21
(01) 500 3157	Fox's Den	Barry Freeman	V23
(01) 200 1044	Hendon MU BBS	Steve Froeschke	V23
(01) 581 3376	Infotel ROS	Mohammed Salleh	V23
(01) 673 7294	Kybernesis CCF	Arthur McBryan	V22,23,22bis
(01) 455 6607	London BB	Daniel Wilder	V23,23V/data only
(01) 657 3240	London Connexion	Kevin Mathews	V22,23,22bis
(01) 423 3575	London Suburban	David	V23
(01) 346 7150	Marctel	Marcus Anselm	V23,23V/data
(01) 648 0018	MBBS Mitcham	Martin Newham	V21,23
(01) 743 7767	Micro-Live BB	David Watkins	V21 only
(01) 316 7402	Micromola	Tom Goodfellow	V23
(01) 660 6807	Out Of The Blue	Alex Comerford	V23,23V/data
(01) 251 8255	Paradigm Opus	John Taylor	V22,23,22bis
(01) 761 3444	Piratel	Danny Thomas	V23,23V/data
(01) 884 1187	Shady Hollow	Steve Underwood	V21 only
(01) 943 1194	Skull's Tower	Ben Humphry	V23
(01) 443 2432	ST London BBS	Stephen Page	V23
(01) 376 5349	SW10 Warehouse	Grant Burch	V22,23,22bis
(01) 348 9400	TBBS London	John Nolan	V23
(01) 577 1890	The Bathtub	Bill Weir	V22,23,22bis
(01) 586 6882	The Star	Nikki Appelboom	V23
(01) 464 2516	The Village	Martin Wybold	V22,23,22bis
(01) 585 3163	Third Wave 2	Geoff Cox	V23
(01) 788 0884	Twilight Zone	Steve Edwards	V22

021 FOR BIRMINGHAM

Phone	Name	Sysop	Type
(021) 353 5486	Ark	James Bastable	V23
(021) 711 1451	Central Opus	Lindsay Reid	V22,23,22bis,25
(021) 744 5561	Chrono's Lair	Colin Earl	V23
(021) 705 5187	Digital Matrix	Clive Warner	V23
(021) 444 8972	Mabbs	Mark Caro	V23
(021) 444 1484	Tug 2	P & S Franchi	V23

061 FOR MANCHESTER

Phone	Name	Sysop	Type
(061) 227 9096	GMBBS	Peter Rodda	V23
(061) 494 6938	Teepee Opus	Terry Thompson	V22,23,22bis
(061) 832 1961	The Co-Op Board	Frank Dent	V22,23,22bis

THE SOUTH EAST

Location	Name	Sysop	Type
Amersham			
(0240) 34946	Dr. Solomons	Alan Solomon	V22,23,22bis
Basildon			
(0268) 778956	Applecrackers	Mike Jones	V23
Basingtoke			
(0256) 471019	Bas Opus	Graham Butler	V22,23,22bis
Biggin Hill			
(0959) 76695	Alt Reality	Robert Walker	V23,23V/data
Bracknell			
(0334) 411621	Hawk's Castle	Gerald Janes	V22,23,22bis
Camberley			
(0276) 66212	The Eye	Andrew Oldham	V23
Chelmsford			
(0245) 466164	Bitmapp Bros	Mike Montgomery	V22,23,22bis
Colchester			
(0206) 862354	Pete's Place	Peter Smith	V22,23,22bis
Crowborough			
(0892) 661149	PD Sig Fido	Rod Smith	V23
Dereham			
(0362) 695314	Armadillo	Toby Simpson	V23 only
East Grinstead			
(0342) 810905	Shades	Neil Newell	V23 only
Felixstowe			
(0394) 276306	Babbs 1	Tony Game	V22,23,22bis
(0394) 279644	Bob's Bizarre	Bob Baal	V22,23,22bis
Fleet			
(0252) 626233	Boog BB	Jeremy Brown	V23
Gravesend			
(0474) 320294	Mike's Board	Mike Kemp	V22,23,22bis
Gosport			
(0705) 524805	Gabbs	Stephen Cole	V22,23,22bis
Godstone			
(0883) 844164	Labbs	Pip Cordrey	V23
(0883) 844044	Mirrorworld	Pip Cordrey	V23
Horning			
(0692) 630197	Dwarfen Realm	Jon Freeman	V23,23V/data
Martham			
(0493) 740656	Martham BB	Neville Grimes	V23,23V/data
Maidenhead			
(0628) 824852	Cats Board	Mike Corby	V22,23,22bis
(0628) 781429	Sentinel	R. Bowman	V22,23,22bis
Newhaven			
(0273) 513872	SBBS – the Firm	Alan Baker	V23
Orpington			
(0689) 50866	Typenet	not known	V21 only
Oxford			
(0865) 882872	Banat Board	N. Middleton	V22,23,22bis
Portsmouth			
(0705) 754851	The Co-Op Board	Geoff Wade	V22,23,22bis
(0705) 258694	Just The Place	David Mather	V22,23,22bis
Princes Risborough			
(0844) 44833	Andrew's Fido	Andrew Eaves	V22,23,22bis
Reading			
(0734) 484847	Ichthus	D & A Rance	V22,23,22bis
Sandy			
(0767) 50511	Exchange TBBS	Alan Walker	V22,23,22bis
Thanet			
(0843) 590000	Musictel	William Holmes	V23,23V/data
Tonbridge			
(0732) 770539	Shareware BBS	Steve Townsley	V22,23
Uxbridge			
(0895) 52685	PD Sig Stores	Ian Phillips	V22,23,22bis
Weybridge			
(0932) 244906	Audio Output	A. Carr-Smith	V23,23V/data
West Drayton			
(0895) 420164	Softnet B	John Bolton	V22,23,22bis

MIDLANDS

Location	Name	Sysop	Type
Corby			
(0536) 205113	Corby Town Opus	Felix Harrigan	V22,23,22bis
Crewe			
(0270) 580099	The Junction	David Thorpe	V23
Dudley			
(0384) 294570	Project BBS	Bert Ilsley	V23
Market Harborough			
(0858) 66594	Welland Valley	Eddy Ralphson	V22,23,22bis
Nottingham			
(0602) 706307	GOOBTEL	Karim Ratib	V23,23V/data
(0602) 817696	MTEL Green Box	D. Nicholsoncole	V22,23,22bis
(0602) 397113	Sherwood Forest	Kevin Lindley	V23
Leamington Spa			
(0926) 21844	MWCFE	Richard Braggs	V23
(0926) 28294	C-4-C	David Melville	V22,24,22bis
Walsall			
(0922) 642206	Chase Net BBS	Andy Newman	V23
Wolverhampton			
(0902) 745337	Wolves BBS	Bill Gardner	V22,23,22bis
Loughborough			
(0509) 826339	The Co-Op Board	Len Burch	V22,23,22bis
Leicester			
(0533) 700914	Leicester Central	Not Known	V23

NORTH EAST

Location	Name	Sysop	Type
Beverley			
(0401) 50745	MBBS Lcnfield	Martin Taylor	V23
Bradford			
(0274) 498221	Belle Vue	Paul Hutchinson	V23
(0274) 480452	Bradford BB	S. Hussein	V23,23V/data
(0274) 541156	EBBS 1	Craig Evenson	V23
(0274) 735962	Maranatha 1	Len Payne	V22,23,22bis
(0274) 573481	Merlin BBS	Ian Gregson	V22,22bis
Grantham			
(0476) 74616	Stargate Opus	Brad Jackson	V22,23,22bis
Halifax			
(0422) 71921	Microlog	Martin Holt	V23
Hexham			
(0434) 606639	Tynedale	John Rawson	V22,23,22bis
Leeds			
(0532) 600749	Lems	Sonny Horsfall	V23
Newcastle			
(091) 490 0327	Argus Project	Graham Denman	V22,23,22bis
(091) 477 3339	Log On The Tyne	John Bone	V22,23,22bis
Stockton			
(0642) 588989	Stockton Opus	Philip Tate	V22,23

SOUTH WEST

Location	Name	Sysop	Type
Christchurch			
(0202) 485723	Lightfingers	Richard Davis	v23
Ilminster			
(0460) 54615	Datasoft Opus	Paul Swift	V22,23,22bis
Newbury			
(0635) 71324	Eddie's BBS	Eddie Seymour	V23
(0734) 713909	Fido UK 1	Rod Smallwood	V22,23,22bis
(0635) 37529	White Lightning	Richard Darnell	V22,23,22b,27,29
Ringwood			
(0425) 471370	Absolute Access	Joe Brouillard	V22,23,22bis
Swindon			
(0793) 813633	Crow's Nest	Steve Carter	V22,23,22bis
Truro			
(0209) 821670	Kernow Opus	Dave Randle	V23

Location	Name	Sysop	Type
Winchester			
(0962) 69322	Winchester Ros	Brent Austin	V23
Worcester			
(0905) 52536	Access Fido	J.W. Brooks	V22,23,22bis
Weston-super-Mare			
(0934) 29570	Avon Opus	Lee Evans	V23

SCOTLAND

Location	Name	Sysop	Type
Edinburgh			
(031) 225 5368	Atari ST BBS	Stephen Baird	V23
(031) 556 6316	Jocks Away!	John Ferrier	V23
	Lambda Board	John Hein	V23,23V/data
Glasgow			
(041) 941 1333	Magpie BBS	David Harper	V22,23,22bis
(041) 880 7863	Scottish Opus	Donald Whannel	V22,23,22bis
Inverness			
(0463) 231339	Betelgeuse 5	Hugh Allan	V23,23V/data

WALES

Location	Name	Sysop	Type
Cardiff			
(0222) 490722	Cardiff Opus	Walt Davidson	V22,23,22bis
Maerdy			
(0443) 733343	MGBBS	Paul Sengupta	V23
Pontypridd			
(0443) 834179	Merlin BBS	Stephen Sandles	V23,23V/data
Swansea			
(0792) 297845	Bulletin AT	DJ Morgan	V22,23
(0792) 203953	WGBBS	Tim Boorman	V21 only
Bangor			
(0247) 270199	Deep Thought	Gareth McLean	V22,23,22bis

NORTH WEST

Location	Name	Sysop	Type
Bolton			
(0204) 491562	Diggertel 1	John Balshaw	V22,23,22bis
Liverpool			
(051) 428 8924	Mailbox	Peter Tootill	V22,23,22bis
Merseyside			
(0695) 421493	Musictel 4	G.R. Oldhams	V23,23V/data
Penrith			
(0768) 773964	NW Opus	Den Deans	V22,23,22bis
Rochdale			
(0706) 358331	The Gas Lamp	Ian Strachan	V22,23,22bis
Warrington			
(0925) 411265	JCB	John Balshaw	v22,23,22bis
Wigan			
(0942) 722984	OSL Health Svcs	David McKendrick	V22,23

CHANNEL ISLANDS

Location	Name	Sysop	Type
Guernsey			
(0481) 712597	Jetset	Jamie Thompson	V23
Jersey			
(0534) 58969	Central Line	Mike Huelin	V23
(0534) 39389	Jersey Opus	Hugh Ashbourne	V22,23,22bis

EIRE

Location	Name	Sysop	Type
Dublin			
(0001) 854522	Dublin Fido	Gerry Clark	V23
(0001) 903341	IACCBBS	Fergus McDonald	V22

VERSATILE VEES

Intelligent modems offer features such as auto-dial/auto answer, sensing of transmission speed and format

Jeff Ashurst

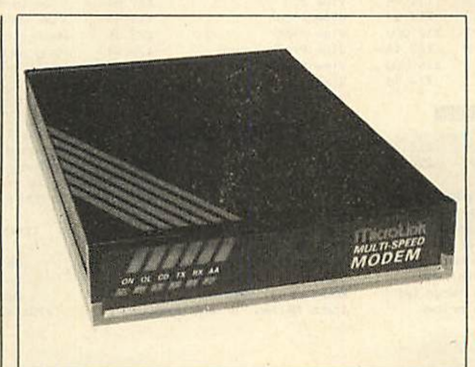
The *Multi-Speed* is one of two communications packages marketed by MicroLink Communications. Each package includes a modem, a bundle of software, cable, registration to MicroLink, validation to use their telex facility, and a month's free connect time to MicroLink/Telecom Gold. These extras, priced separately, could be worth around £85, depending on use.

For comparison the lower priced *Dual Speed* package, £99 including VAT, also features the modem and all the extras. The *Dual Speed* modem is switchable to either V21 (300/300 bits/sec) or V23 (1200/75, Viewdata speeds) modes. The more interesting *Multi-Speed*, reviewed here, will operate not only at V21 and V23 rates but also at the faster V22 speed – 1200 bits/sec, full duplex. In addition it features auto-dial and auto-answer and retails at £169 inclusive of VAT and the aforementioned bundle of extras.

The *Multi-Speed* is housed in a neat, flat, black and red casing measuring 160 by 35 by 242 millimetres. With the exception of a small, recessed reset button in the rear panel, there are no manual switches. All connectors are in the rear panel: these are the telephone line to the British Telecom socket, a socket for connecting a standard telephone, the power supply, and the D25 socket which connects to the BBC Micro's RS423 DIN socket via the cable supplied. Call status and power on/off information is displayed by six LEDs on the front panel.

Speed differentials

The difference between the *Dual* and *Multi-Speed* modems is not simply the higher speed capability: they operate in totally different ways. Whereas the *Dual Speed* relies on the software to control its func-



Multi-Speed takes off

A	: Answer call without delay
C	: Carrier control Co=OFF, C1= ON
D	:Dial number and originate call
E	: Echo commands E0=OFF, E1=ON
H	: Hook control HO=ON, H1=OFF
I	: Display identity In (n=o, 1,1)
M	: Monitor status Mn (n=o, 1,2)
N	: Display/set number store
O	: Go back on line
P	: Pulse dial
Q	: Result codes Q0=ON, Q1=OFF
R	: Reverse to answer after dial
S	: Display/Set S registers
T	: Tone Dial
V	: Result codes V0=Number ic, V1=English
W	: Wait for secondary dial tone
X	: Extended result code Xn (n=0–4)
Z	: Reset S registers/commands
&F:	Restore Factory Settings
&S:	Show Current Settings
&W:	Write Back Current Settings

Table 1. Hayes modem commands

tions, the *Multi-Speed* is an intelligent modem – effectively a dedicated computer in its own right, with its own microprocessor, ROM software, and read/write memory to hold the names of online services and their telephone numbers.

The modem has two operating states: command mode and online mode. In command mode, the modem is controlled by character sequences sent from the computer. These sequences instruct the modem's on-board software, and they conform with the popular Hayes command set. Any software which will output ASCII characters to the RS423 interface can be used to control the modem. The bundled software consists of the communications and word processor modules from the popular *Mini Office II* suite – the word processor allows offline preparation of messages, with consequent economies in connect and telephone charges. I also used the modem successfully with *Dialup*, *Modem Master* and both *Commstar I* and *II*.

Online, the modem is fully automatic. It senses the transmission speed and data format and adjusts itself accordingly. Built-in buffering and speed conversion allows a V23 link to a remote host while operating a 1200/1200 bits/sec connection between the modem and the micro.

Hayes has it

Hayes commands were developed in the United States and have been adopted as an industry standard by many others: Hayes has become the IBM of the modem world. The commands are easy to use: each starts with AT, to grab the modem's ATtention, followed by one or more characters (see Table 1).

To illustrate, let's look at two of the commands, N and D. The former accesses the modem's telephone ‹N›umber store, while the latter instigates auto-‹D›ialling. Thus ATN? causes the list of numbers currently stored to be displayed, while ATDN12 instructs the *Multi-Speed* to dial the telephone number stored at number 12 in the list. It's as simple as that! To store an

item on the list, at number 28 say, enter ATN28=. The modem asks first for a name, then for a telephone number. Up to 32 names and numbers may be stored in this way, maintained in non-volatile memory by a battery backup; the battery is on charge when the modem is under power.

The Hayes protocol includes a set of Standard 'S' Registers, which hold the values of a set of parameters relating to communications protocols, such as response times, characters recognisable as linefeed, backspace etc (see Table 2). Default values are held but all parameters are user-programmable.

This is a first class product which I was sorry to send back after the review. I was impressed by the simplicity of its operation and it represents excellent value for money when compared with devices of similar capability. With a VAT-inclusive price tag of £169 it undercuts similar modems – even without taking the extras into account. Of these, the month's free connect time could easily be most valuable for anyone new to Telecom Gold. Bills tend to be higher when you are low on the learning curve. If you buy one of these, do spend as much time as possible, in the first month, feeling your way around!

S000=000	Rings to answer on
S001=000	Ring count
S002=043	Escape char
S003=013	Carriage Return char
S004=010	Line Feed char
S005=008	Backspace char
S006=004	Secs, Dial tone wait
S007=040	Secs, Carrier wait time
S008=004	Secs, Comma pause
S009=006	100ms, Carrier detect response
S010=007	100ms, Carrier loss response
S011=090	Duration/spacing of DTMF
S012=050	20ms, Escape guard time
S013=000	Reserved
S014=247	Reserved
S015=000	Reserved
S016=000	Reserved
S050=001	Speed buffer enable is ON Ac
S051=004	V22 1200/1200
S052=000	Repeat dial tries
S053=001	Auto baud rate scan is OFF
S054=003	Secs, baud rate scan period
S055=000	Reserved
S056=000	Reserved
S057=010	Mins, Inactivity timeout
S060=011	FIDD Result code override

Table 2. Parameters held in Hayes 'S' registers

In conclusion, I see this package as an opportunity to acquire the best for less.

The Multi-Speed *modem is from MicroLink Communications Ltd, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP. Telephone (0625) 878888.*

COMMS JARGON

Modem: acronym for Modulator/ Demodulator, a device which converts voltage levels from the computer's serial port into audio frequency tones which can be transmitted down a telephone line (modulation).

Conversely, it converts audio tones from the 'phone line into voltage levels that the computer can recognise (demodulation).

Protocol: an agreed set of rules governing the communications flow and other parameters such as the meanings of special control codes. For example most — but not all — protocols accept Ctrl-Z as the 'end of file' marker.

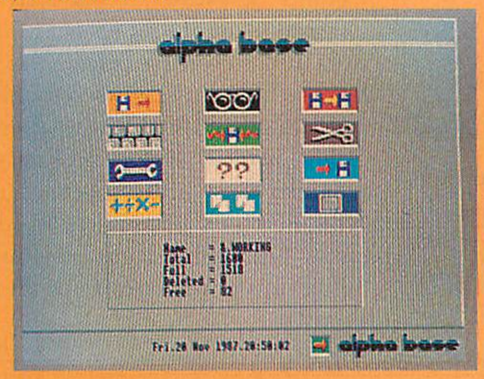
Comms Software: in principle, communications can be set up and controlled from the keyboard; in practice this would be very tedious. Comms software contains features such as menu selection of speeds, number of data bits etc, which simplifies the process of setting up and controlling a comms session. In addition the software will recognise one or more protocols, and will often allow set-ups to be saved.



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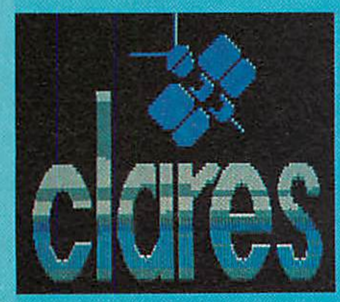
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TAKE NOTE

This program breaks the sound barrier by converting *The Music System* files to Acorn User's *Autumn* format

Richard Sheard

The BBC Micro has excellent sound capabilities, which many software packages exploit to good effect. Computer programs, especially games, can be greatly enhanced by the addition of a little tune. This involves reading notes from the score and looking up the value for its pitch and duration in a table. These numbers are then either typed in directly as SOUND statements, or included in DATA statements.

A much better way is to use one of the many music editors available, such as *The Music System* from Island Logic/System Software, or *Theme*, published in *Acorn User*, April 1987. These packages allow music to be entered rapidly, played back and easily altered. The problem is lack of compatibility. You are rarely able to load and play these tunes in your own programs.

Autumn

A standard way of storing music data is needed so that tunes are easy to transport between programs and machines. The *Acorn User* Tune and Music Notation (*Autumn* for short) attempts to do just this, providing a simple method of storing notes on tape, disc or network. *Autumn* was introduced and explained at length by its author, Dave Acton, in *AU* April '87 but here is a very brief synopsis.

Each note is defined normally by four bytes specifying the voice, volume, pitch and duration; but rather than storing four bytes per note, *Autumn* uses two. An *Autumn* music file is divided into three voice channels (the fourth, the noise channel, is ignored). Two-byte pointers at the start of the file indicate where each part begins in memory.

Byte	Function
0	Pointer for voice 1 start (low byte)
1	Pointer for voice 1 start (high byte)
2	Pointer for voice 2 start (low byte)
3	Pointer for voice 2 start (high byte)
4	Pointer for voice 3 start (low byte)
5	Pointer for voice 3 start (high byte)
6	Pitch, note one, voice one
7	Duration, note one, voice one
...	Rest of voice one data
i-1	255, termination pitch for voice 1
i	Pitch, note one, voice two
i+1	Duration, note one, voice two
...	Rest of voice two data
j-1	255, termination pitch for voice 2
j	Voice three data
End	255, termination pitch for voice 3

Figure 1. *Autumn* file specification

ILLUSTRATION BY SARAH McMENEMY

Figure 1 summarises the structure of an *Autumn* file. The SOUND data for each voice consists only of the bytes defining pitch and duration for that voice.

Certain pitches have been reserved to perform various functions: for example a pitch of 255 indicates the voice has finished, so no more bytes should be read.

Pitch	Meaning
0	Rest, next byte gives duration
1-239	Standard pitch, next byte gives duration
240-253	Reserved for enhancements
254	Redefine voice envelope, next 13 bytes are parameters
255	Termination pitch for voice

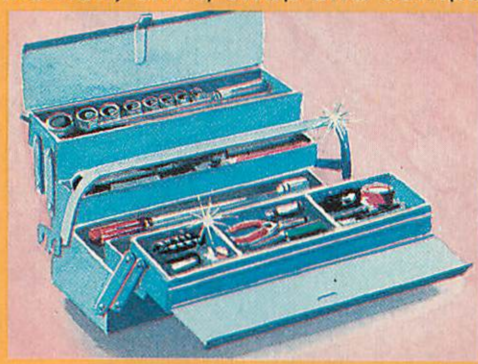


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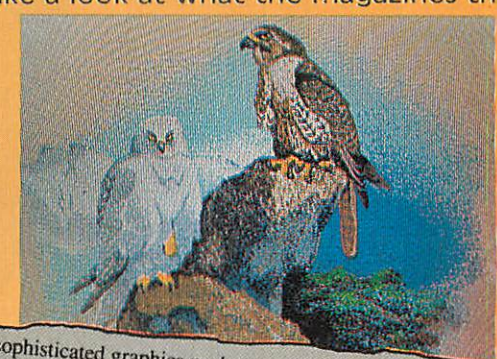



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A & B December 1987 & January 1988

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Volume, defined by an amplitude or envelope number, is relatively constant throughout a piece of music, so only variations need to be flagged. A value of 254 indicates a change of volume via the voice envelope and, since each ENVELOPE number is tied to the corresponding voice, there is no need to specify which envelope is to be changed.

The Music System

Now that we have defined a standard format for music files – or rather, Dave Acton has – we need to be able to convert music files from other software packages to fit in with it. The program presented here, *TMSconv*, takes music files for Island Logic/System Software's *Music System* and changes them to *Autumn* format.

The Music System (*TMS*) is much more complicated than the *Autumn* standard. You can use key signatures, accidentals (sharps and flats), repeats, first and second time bars and so on. The key signature and accidentals merely modify the pitch of the note, so during the conversion process this can be taken into account and the altered pitch stored. An accidental acts for the complete bar, not just the note to which it is attached, so a record must be kept of the accidentals set during a bar and this record reset at the start of a new bar.

Repeat signs cause sections of music to be repeated. These can be coded in one of two ways. The simplest method is to store the repeated section twice in succession. This makes it easy to handle first and second time bars, and provided the repeated sections are not too long, the extra space used will not be too wasteful.

The alternative method is more complicated and requires much more work to be done by the playback program, and playback may be erratic because of the extra time needed.

TMSconv uses the first of these methods, as accurate playback is more important than optimisation of music data.

TMS allows 15 envelopes to be used in each tune, at 15 different volumes. Hence for each volume or envelope change, the voice envelope must be redefined. This demands considerable space overheads if such changes are frequent. If tunes contain lots of short notes as well, playback will become erratic because the voice may stop while the envelope is reprogrammed.

TMS produces files of three types: music files (placed in directory 'm'), *TMS* format envelope files (directory 'e') and BBC format envelope files (directory 'b').

Music files contain all the necessary data to play the tune in *TMS*. The structure of the music file is as shown in figure 2.

Byte	Function
0-7	File identifier ("IamMusic")
8-14	Name of envelope file used at last save
15-269	*TMS* format envelope data for voices 1, 2 and 3
270	Key signature number
271	Tempo number
272-273	Time signature number .
274-275	Number of notes in voice 1
276-277	Number of notes in voice 2
278-279	Number of notes in voice 3
280-281	Number of notes in voice 4
282-...	Voice 1 data
...-...	Voice 2 data
...-...	Voice 3 data
...-End	Voice 4 data

Figure 2. Structure of *TMS* music file

The eight bytes at the start of the music file enable it to be identified as such. *TMSconv* checks these bytes before conversion to make sure that you are using a legal file.

The envelope data is stored in *TMS*'s internal format. This is backwards when compared to the data on the corresponding *TMS* envelope file, so when it is extracted the data has to be reversed before being written to the envelope file.

The key signature is stored at byte 270 as a number from zero to 14. Bit 7 of this byte is zero for a major key, and 1 for a minor key (figure 3).

Value	Major	Minor	Sharps/flats
0	C	A	–
1	G	E	1 sharp
2	D	B	2 sharps
3	A	F#	3 sharps
4	E	C#	4 sharps
5	B	G#	5 sharps
6	F#	D#	6 sharps
7	C#	A#	7 sharps
8	F	D	1 flat
9	Bb	G	2 flats
10	Eb	C	3 flats
11	Ab	F	4 flats
12	Db	Bb	5 flats
13	Gb	Eb	6 flats
14	Cb	Ab	7 flats

Figure 3. Key signatures stored at byte 270.

The tempo and time signature bytes are ignored by *TMSconv*, as the user selects the tempo on playback, and *Autumn* does not keep a record of bars.

The total number of notes in each voice is stored as low byte first, high byte next. From these the offsets to the start of each block of voice data can be calculated. *TMS*, like *Autumn*, stores the notes for each voice in a separate block on the file. Four voices are supplied by *TMS* – three for music and the fourth for percussion. The percussion voice is ignored by *TMSconv*.

Each note is stored as three bytes:

Byte	Bits	Function
1	0-2	Bar symbols
	3-6	Duration
	7	Always set
2	0-2	Accidental
	3-7	Pitch
3	0-3	Volume (zero for a rest)
	4-7	Envelope number

Bar symbols are given the following values:

Value	Symbol
0	No symbol
1	Bar line
2	Open repeat
3	Close repeat
4	First time bar
5	Second time bar
6	Tie
7	Tie across bar line

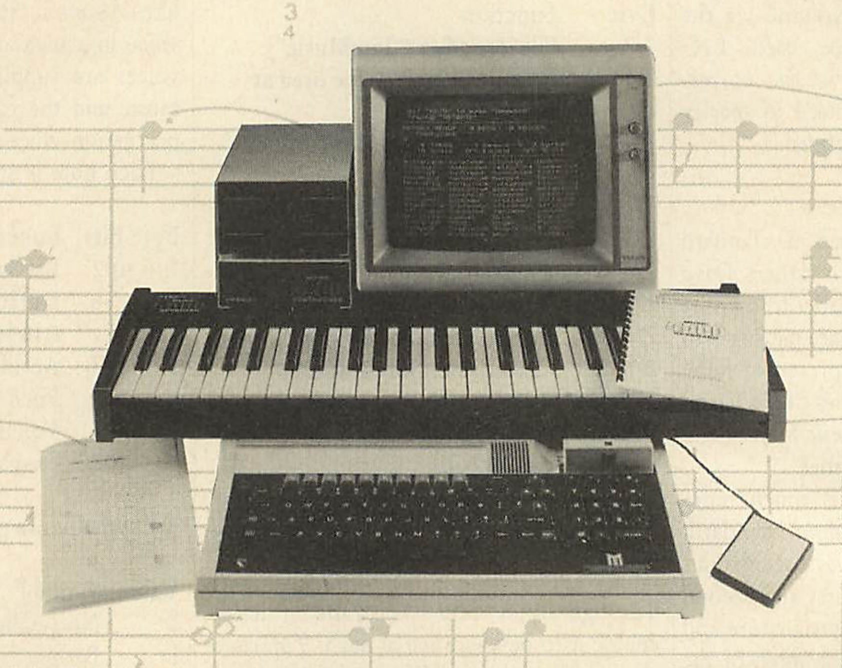
These act on the gap between the current note and the next. Accidentals have the following values:

Value	Accidentals
0	No accidental
1	Natural
2	Sharp
3	Flat
4	Double sharp
5	Double flat

The duration of the note is stored in four bits. A value of zero indicates the shortest note and 10 the longest. Durations 11 to 15 are used to indicate that the note is a member of a triplet, and must be played with a duration of two-thirds that specified. When a triplet is encountered it is stored with 128 added to its duration. The duration of the note played must then be calculated by the playback program, taking the tempo into account. In general it is best to avoid the use of triplets if you intend to convert a tune to *Autimn*, because notes of fractional duration cannot be stored or played back accurately. This will have the effect of disrupting the synchronisation of the voices, particularly at faster tempos.

OFFERS

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The pitch is stored in five bits, giving a total of 32 possible notes numbered zero (the lowest note) to 31 (the highest). On this scale, middle C is note number 11. The pitch required by *Autumn* can be calculated from this number. *TMSconv* keeps a record of the key signature and any accidentals set during a bar and modifies the pitch accordingly before storing it. The accidentals record is reset every time the end of a bar is reached.

TMS envelope files

These contain envelope data in internal *TMS* format as follows:

Bytes	Function
0-7	File identifier ("IamEnvel")
8-262	Envelope data
263-290	Foldover limits

TMSconv takes the envelope data from a music file and writes it to a file of this format which can be read by *TMS*. The eight-byte identifier at the start ensures that *TMS* recognises this file as containing envelope data in the internal format. The foldover limits are not important in the conversion or play-back of *Autumn* files and are ignored by the conversion program.

BBC envelope files

These contain the envelope data which can be used in the Basic ENVELOPE statement. *TMS* stores and uses envelopes with its own intrnal format, but these can be converted to BBC format using the Synthesiser module. Each of the 15 envelopes is stored on the file as 16 bytes – the first 13 being the envelope parameters, and the remaining three the foldover limits.

Using the converter

Once you have typed in the listing, save it in case you inadvertently run *TMS*. You are now ready to convert a music file.

First select option 3 from the menu to extract the envelope data from the music file. Type in the name of the music file, and then the name of the envelope file you wish to construct. Please note it is not necessary to type in the directory prefixes. The new envelope file will be created and after a short pause the main menu will reappear.

Once you have created the envelope file it needs to be converted from *TMS* format to BBC format. To do this select option 3 and follow the instructions to run *TMS*. Select the Synthesiser icon when the main screen appears and press Return. When the module has loaded, position the highlight bar over 'Envelope File 1' and type in the envelope file name. Press f8, then the Space bar to select envelope set 1-15. Finally press Return to load. Move the highlight bar over 'File Type' and change this to 'BBC format' using the cursor keys. Press f9 to save, making sure envelope set 1-15 is selected. This saves the envelopes in BBC format under the same filename, but in directory 'b'. Switch the computer off to get rid of *TMS*, then turn it back on and reload *TMSconv*.

To convert the *TMS* music file to *Autumn*, select option 1 and type in the filenames. *Autumn* files will be saved by directory 'a'. If you wish to use the default envelopes, type in "def". Wait while the file is converted. When finished you can choose to hear the tune before saving it.

TMSconv relies on being able to use random access files. If you only have cassettes, the program will need to be modified to load the music file (or just the current voice) into the extra memory available on tape machines before processing, and the relevant 'get byte' commands replaced with commands to read from this part of memory. You will need to maintain a pointer to the current byte, incrementing it after each byte is read.

NORSE POWER

A study of Vikings, using a variety of software, proved a stimulating project

Chris Drage and Nick Evans

During the spring term this year, a class of 30 eight-year-olds prepared to 'do battle' and tackle the Vikings – in the safety of their classroom. As the Vikings form a part of the curriculum for this age group, it wasn't difficult to introduce the topic – the mere mention of the word 'Vikings' seemed to fire the children's natural curiosity.

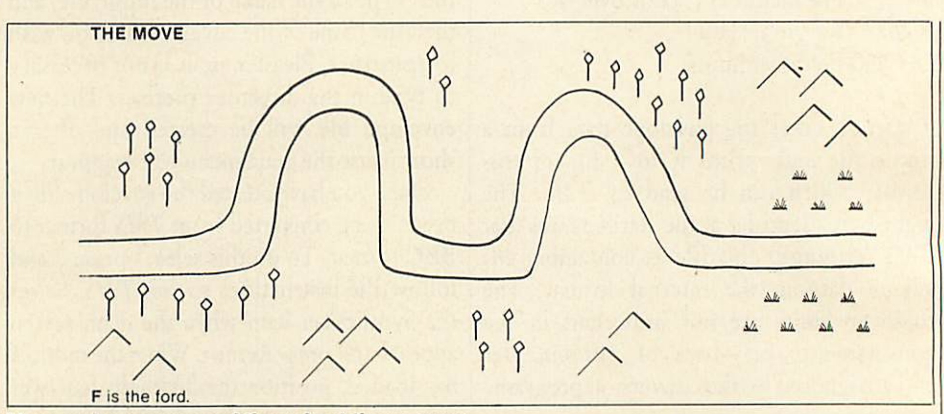
It is frequently difficult to introduce historical topics to young children, as they are so remote from the children's own experiences. Fortunately, with a study of Viking England, there are ample resources to provide the necessary vicarious experiences. Important among the list of resource materials for the spring project was computer software – both content-based and content-free. How did the teacher integrate the software with the other resources to motivate and stimulate learning?

The first part of the study revolved around three major information sources: BBC's *ZigZag* television programmes, Fernleaf Software's *Vikings* Pack and Junior Projects No.34 from Scholastic Publications. The first phase of any project concerns information and image gathering: the *ZigZag* broadcasts were invaluable in providing visual imagery and motivating children to seek further knowledge.

There is no computer program anywhere that can act as a substitute for that most vital ingredient – direct experience. Unfortunately, these London children lived too far from what is regarded as the foremost Viking site, the Jorvik Viking Centre at York, to permit a visit. However, a British Museum exhibition based loosely on the theme of the *ZigZag* broadcasts allowed the children to look at Viking artefacts and visual images of the Viking way of life. This valuable experience was reinforced by watching a video about the Jorvik Centre included in Fernleaf's topic pack.

Back in the classroom the children set about looking for evidence of Viking settlement in Britain, using place names on maps as a guide. On a map of England the children plotted the occurrence of Norse names, those ending with -by, -thorpe and so on. The computer was called into play running *Placenames*, one of the simple, dedicated databases from Resource. The children searched this for occurrences of Viking names too, and it slowly became evident that the Vikings predominantly settled in North East England.

At this point, the Fernleaf *Viking England* simulation was introduced to the children before small groups of them attempted the first program – *The Raiders*. This software really suits 9 to 10-year-olds, but with the teacher's assistance, and careful explanation, the children were able to grasp the point of the program and its operation quite quickly. *Viking England* is one of Fernleaf's early publications and the teacher was initially concerned that the children would be critical of its simple graphics and the large volumes of text used in the program. They are used to the current crop of well-illustrated educational software. However, after the first group 'returned to Norway' with a third more booty than they were sent to capture and the 'Thing' voted their journey a success, it was evident that none of the other groups was going to be outdone! Marauding became the order of the day. While groups worked through the software, the main body of the class were engaged in a number of related activities.



Maps and runes are used throughout the program

The dramatisation by the whole class of the fall of London Bridge at the hands of Viking raiders sailing up the Thames proved very popular with the assembled school. In another activity, the children painted large scenes from the Viking legend of Thor's visit to the giants. The legend was retold by the children for the school, using their paintings as illustrations. A 'Viking whodunnit' play, part of the *ZigZag* broadcasts, provided an opportunity to set the classroom up as a courtroom with children taking the part of 'jurors' and 'prosecutors' as they attempted to pin the crime on one of four suspects.

In craft, design and technology the children had to design and build model Viking longships from junk materials lying around the school. The resultant model ships were each tested in a tank of water. Their speed was measured in a timed run, using a hair drier to fill the sails. The results of the tests were described and recorded on charts. *Display Data* from Resource allows children to enter data into the computer and have it printed out in the form of a barchart, piechart or windrose. Content-free software of this nature really enables children to grasp the significance of the computer as a tool in the classroom. Charts were quickly produced to illustrate the results of the tests, without all the time-consuming drawing. This encourages the children to work on interpreting the data instead of concentrating on presentation.

The latter part of this study involved the children working in groups of five or six on

a variety of activities ranging from researching information in books and viewing slides to listening to a taped story and completing a sequencing exercise. Two of these group activities involved the classroom computers. The teacher had created a short piece of text about the Vikings with the program *Developing Tray*. For readers unfamiliar with this, it is perhaps the ultimate cloze exercise. The software requires the children to reconstruct the passage of text from a series of dashes and a few of the least common letters. The program stimulates an amazing amount of discussion over strategies and the validity of predictions. A notepad can be used to check whether suggestions make sense, to test predictions and to make notes. Although the emphasis was most definitely away from inter-group competition, it soon became apparent that this activity was one of the most popular of those offered as groups tried to outdo each other on points. The amount of research from books that this activity stimulated far exceeded the teacher's original estimation.



The Jorvik Viking Centre — a program is no substitute for experience

Undoubtedly the most popular activity was the simulation offered by *Viking England*. The children, now familiar with *The Raiders*, were keen to continue with the second and third parts of the suite, *Journey's End* and *The Move*. In the former, the children take on the leadership of a Viking party intent on settling in England. Decisions regarding the choice of site and the order in which various tasks must be completed are most important in this part of the program suite.

A valuable aspect of this exercise lies in the fact that children must think up other tasks they consider important too, apart from those offered by the program. The subsequent discussion reveals a great deal about the children's comprehension of the Vikings and their way of life. The arrival of another party of Vikings, who settle away from the children's own 'group', provides opportunities for cooperation and empathy, balancing the somewhat materialistic attitudes present in *The Raiders*. The children must decide whether or not to coexist peacefully with these strangers. The quality of the children's decisions are tested when they and the neighbouring party are each raided by a third party of Vikings. If they have decided wisely, they survive.

In the third and, for these children, the final part of the suite, the group must decide whether to join forces with the other party (who suffer huge losses), and whether to move to a more permanent location away from the coast. Decisions relating to the siting of the settlement, a mill, a bridge and a port are balanced with those relating to the human resources. For example, how can the party's fishermen be placated, and which skills in the community will be important? As a record of their work, the children completed maps depicting the siting of their settlements. The teacher has access to a record of each group's decisions via a teacher's page within the program.

The fourth part of the Fernleaf suite, *The Jarl*, concerns the organisation of the community and the settlement of disputes, dealing with law-breakers and so on. The scope of this was judged to be too difficult for this class of eight-year-olds.

When the computers were not engaged in running *Developing Tray* and *Viking England* they were seldom idle. The students used them for wordprocessing and printing text, headings and captions and for their project books. *Pendown* and *Signwriter* (from Logotron's Pendown Toolbox) are the standard tools in this class. The children really appreciate the various fonts and sizes of letters that the software produces on the printer, which they cut out, colour in and mount in their scrapbooks.

To say the children gained a great deal from this historical study is to understate the case. Through experiences both direct and vicarious, and abetted by a wide range of resources, they became aware of many aspects of the Vikings' world and learnt of a way of life which the popular stereotype completely overlooks. The computer, using a variety of software tools, played a valuable part in presenting the topic to the children. It gave them fresh perspective and was highly motivating. The *Vikings* suite was a complete success, but a good deal of teacher-support was required because the children were rather young. *Developing Tray* also provided the children with a fascinating linguistic exercise. Other software used was predominantly of the content-free type, providing children with tools to help them improve or extend their project work. Provided that it is integrated with a number of other resources and does not become an end in itself, the computer, armed with suitable software, can occupy a significant place in the range of activities presented to children.

Viking England *(£35) and the* Vikings Resource Pack *(£49) from Fernleaf Educational Software, Fernleaf House, 31 Old Road West, Gravesend, Kent DA11 0LH for the BBC B, B+, Master 128, Compact.*

Display Data/Weather *(£19.95+VAT) is available from Resource, Exeter Road, off Coventry Grove, Doncaster DN2 4PY, for the BBC B, B+, Master 128.*

Pendown *(£44.85, £39.10 schools) and* Pendown Toolbox *(£17.95) are available from Logotron, Dales Brewery, Gwydir Street, Cambridge, CB1 2LJ for the BBC B, B+, Master 128, Compact.*

Developing Tray *is available free from your local education authority computing centre.*



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4) Words that have the correct letters, but are mixed up, (solves anagrams).

All these search facilities are accessible from any program that can issue star (*) commands.

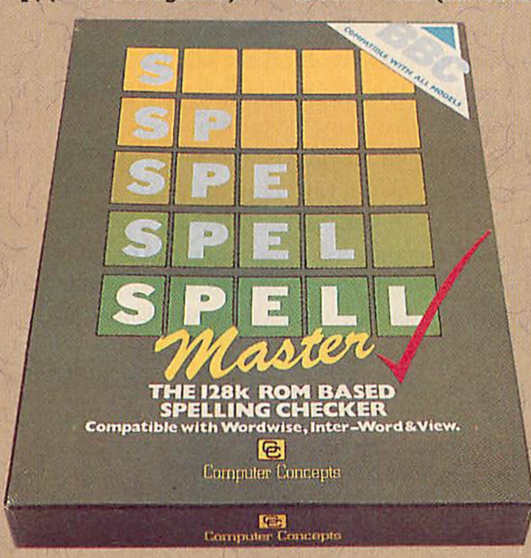
In addition there are facilities to check text directly within a variety of text editors or word processors, to check the word at the cursor, to check all text from a specified point, or to just browse through the dictionary.

The BBC SPELLMASTER can check-as-you-type in INTER-WORD, WORDWISE, and VIEW, in all versions of the BBC Micro. The Archimedes version can check-as-you-type in INTER-WORD, is compatible with ArcWriter files and requires a ROM expansion board.

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APPLICATIONS UNLIMITED

BBC micro users reveal ingenious new uses for their computers



Roger Carus

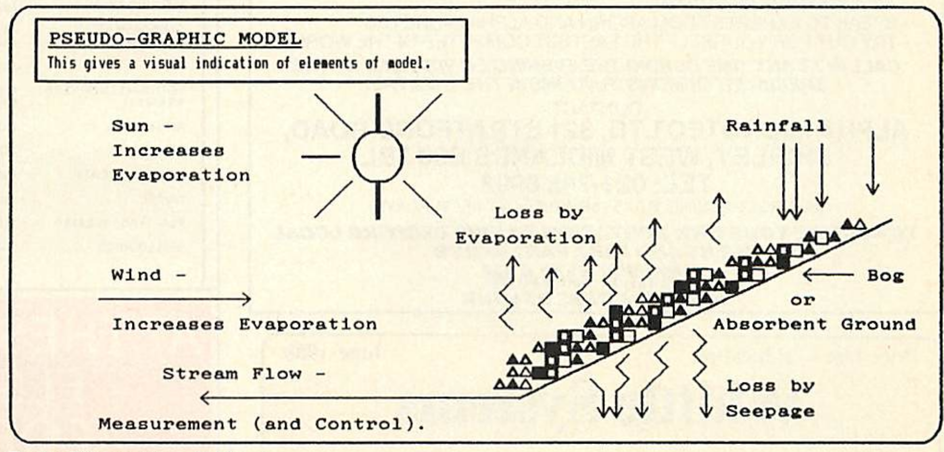
One of the most enjoyable things about your letters is discovering how often people write to me about something they are doing, but which is being done elsewhere in a totally different way. It explains why inventions are often claimed by several people at the same time.

From the scientific and technical to leisure activities: John Pettitt of Rushden, Northants, had a problem arising from setting up a chess competition with some friends. The problem was to produce a fixture list for 12 players. Eight or sixteen are easy because you can buy blank fixture tables, but the smaller number produces problems.

The difficulty is to arrange a total of 66 matches for 12 players over 11 weeks, each person playing a different opponent once per week, and allowing for 'home and away' ties. It follows that no matches can be repeated and no player can play more than once a week.

He managed to do it – with much hard work – only to have an extra player join the competition the night before the series started! Since then he has improved the system and, having run the program myself, I found it most impressive. It can produce a fixture list for up to 14 players in less than five minutes and includes facilities for printing and spooling to a wordprocessor. It also runs on cassette, and could be useful to others with knockout tournaments to arrange.

Of the many useful technology and games programs sent in, each invaluable to anyone facing similar problems, I occasionally see a good example of a commercial use. A nice one was sent in from Ivybridge, in Devon, by Mr G.E.A. Rand, technical manager of WestMac, who described his experience with using a micro.



Text with graphics, in View



Mastering the art of spreading

The company deals in many types of agricultural machinery and need to keep track of stock, sales and payments. They began by using a micro with a Torch Z80 second processor, running Compsoft Delta 3 for the larger jobs, and a standard BBC model B to produce consignment notes and invoices to customers.

They had planned to switch to a much larger system – an IBM 36 – but installation problems sent them back to the old system. Then they bought a Master, with a 65C02 internal second processor *and* a 32016 external second processor, to look after their warranty system.

Among other services to customers, they offer a program producing optimum settings for a commercial fertiliser spreader, so that the operators can make the most economic use of the fertiliser.

Clearly an enthusiast himself, Mr Rand also runs a small business dealing in fuchsias. He uses a different configuration at home to classify his stock by name, type and colour, and for stock control.

Finally, John Nolan has written to us about his utilities to do multi-columns and simple graphics in *View*, as shown above. Contact him at 49 Kewferry Rd, Northwood, HA6 2PE.

If you use your micro for business or pleasure, or have written a piece of useful software and would like to share your knowledge and experience, write to Roger Carus, c/o Acorn User, *Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ: British Telecom Gold: 81RED001.*

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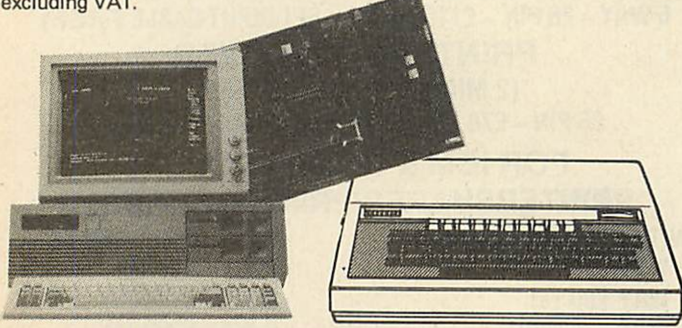
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"MICRO MUSICIAN is an advanced program and is effective in many areas. As the system is based upon composition and a child centered approach, it hopefully can be meaningful and relevant to the child. It is a very flexible system and can be used effectively with children of any age, and I feel soon it will make a big impact into the music curriculum of schools." *K.F. Education Microtech Unit, West Bromwich*

"This is an excellent program. I am completely sold on the "letter in a note facility", which the pupils really enjoy." *T.D. Music Teacher, London*

"In the August "Acorn User" a whole number of Music Systems are reviewed. All of these products are vastly inferior to yours." *D.W. Music Teacher, Somerset*

"There are so many features in this program that it would be impossible to do justice to it in a review like this, (it can transpose, print out music, allow aural tests). If you feel that the computer has a place in music education, this is an excellent starting point." *T.S. Advisory Teacher, Warwickshire*

"The enthusiasm shown by the teachers indicates how right your system is for the market you are hoping to capture." *M.J.B. Advisory Teacher, Worcester*

"A Superb program." *A.C. Headmaster, Nottinghamshire*

"Excellent." *C.B.L. Head of Resources, Devon*

"My first impression of MICRO MUSICIAN as a first class system is now confirmed. It is way ahead of the competition." *D.R.W. Music Teacher, Somerset*

"We are immensely impressed so far." *C.J.P. Project Director, Surrey*

"I've recently purchased your "MICRO MUSICIAN" software system and on inspection it seems to have considerable potential for school use." *G.J.J. Head of Music, Wiltshire*

"I am now able to print out the music on my Centronics GLP printer for the first time, and I am delighted with the results." *J.A.B. Teachers Centre, Newcastle*

"I am sure you will be pleased to hear that our work with the Casio CT-102 and the computer is going extremely well and is very popular with the pupils." *M.W. Special School, Leicester*

"I have been using the keyboard and software and am very impressed by its versatility." *L.W. Music Advisor, Newcastle*

"Our school parent teacher association felt that it added greatly to their child's education." *B.C.P. Primary School Teacher, Berkshire*

"Impressed by the versatility." *C.D. Primary School Teacher, Cleveland*

"Thank you for the "MICRO MUSICIAN" music teaching system which is working excellently." *D.R.G. Head of Music, Yorkshire*

"At this point I would state that we are very pleased with the way your product is developing, especially in consideration of other computer/music applications that we have experienced, including that of the Archimedes system." *G.M.L.H. Music Advisor, Durham*

MICRO MUSICIAN is available as follows:–

STAND ALONE VERSION
MICRO MUSICIAN software for BBC "B" & "Master" computers, complete with teacher support manuals. Price £26.00 plus VAT.

MIDI VERSION
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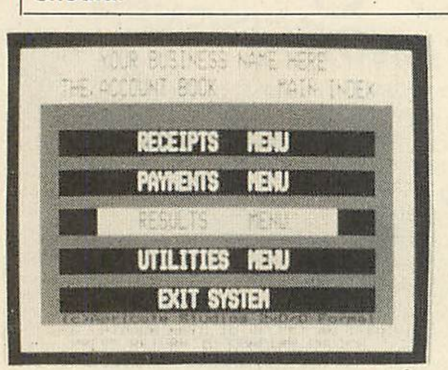
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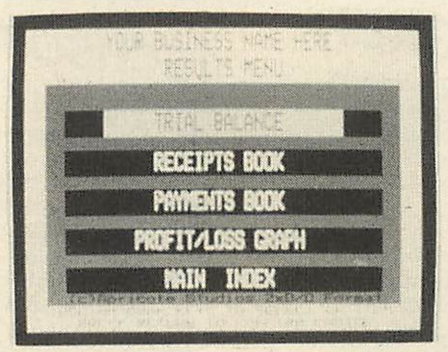
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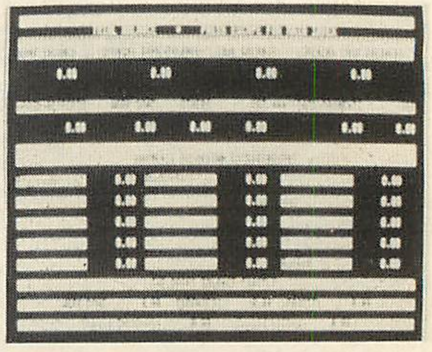
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COMPATIBILITY

Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	Arc	6502SP/ Turbo	ADFS	Econet	Shadow RAM	Monthly T/D
Hints & Tips	81											
Listing 1		■	■	■	■			■	■	■	■	■
Listing 2		■	■	■	■	■	■	■	■	■	■	■
Listing 3		■	■	■	■	■		■	■	■	■	■
Joe's Jottings	82											
Listing 1		■	■	■		■	■	■	■	■	■	
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Listing 1(1)		■	■					■	■	■	■	■
Listing 2		■	■					■	■	■	■	■
Top of the List Listing 1	96	■	■	■	■	■		■	■	■	■	■

Note
1.Requires 'The Music System'

HINTS & TIPS

See Hints & Tips, page 33

Listing 1. Fast tape load/save

```
   10 REM Tape Turbo
   20 REM by Michael Sti
rling
   30 REM for B/B+/M/E
   40 REM (c) Acorn User
 July 1988
   50 :
   60 MODE 7
   70 PROCassemble
   80 PROCcheck
   90 PROCsave
  100 *FX 200
  110 END
  120 :
  130 DEF PROCassemble
  140 osbyte=&FFF4
  150 osascli=&FFE3
  160 step=2
  170 delay=255
  180 FOR pass=0 TO step
 STEP step
  190 P%=&900
  200 [OPT pass
  210 .setup
  220 SEI
  230 LDA #cfs MOD 256
  240 STA &220
  250 LDA #cfs DIV 256
  260 STA &221
  270 CLI
  280 LDA #14
  290 LDX #4
  300 JSR osbyte
  310 JMP message
  320 :
  330 .cfs
  340 PHA
  350 TXA
  360 PHA
  370 TYA
  380 PHA
  390 PHP
  400 LDA #176
  410 LDX #delay
  420 LDY #0
  430 JSR osbyte
  440 PLP
  450 PLA
  460 TAY
  470 PLA
  480 TAX
  490 PLA
  500 RTS
  510 :
  520 .message
  530 LDY #0
  540 .print
  550 LDA data,Y
  560 JSR osascli
  570 INY
  580 CMP #13
  590 BNE print
  600 RTS
  610 :
  620 .data
  630 OPT FNequs("The in
terblock gap will now be
 very short. Enter *FX13
,4 to disable the routin
e.")
  640 OPT FNequb(13)
  650 ]
  660 NEXT
  670 ENDPROC
  680 :
  690 DEF PROCcheck
  700 PRINT "Checking as
sembly... ";
  710 FOR check%=setup T
O P%-1
  720 sum%=sum%+?check%
  730 NEXT
  740 IF sum%<>13715 THE
N PRINT "Assembler error
, check listing":END
  750 ENDPROC
  760 :
  770 DEF PROCsave
  780 CALL setup
  790 *FX 200,1
  800 PRINT '"Press RETU
RN to save the machine c
ode as 'gap', SPACE to e
nd: ";
  810 *FX 15,1
  820 REPEAT
  830 key=GET
  840 UNTIL key=32 OR ke
y=13
```

Continued

◀ **Hints & Tips Listing 1 continued**

```
  850 PRINT'
  860 IF key=32 THEN PRI
NT "END":ENDPROC
  870 *OPT 1,2
  880 name$=" gap "
  890 start$=STR$~setup
  900 end$=STR$~P%
  910 PROCoscli("SAVE"+n
ame$+start$+" "+end$)
  920 PRINT '"Done"
  930 ENDPROC
  940 :
  950 DEF FNequb(b%)
  960 ?P%=b%
  970 P%=P%+1
  980 =pass
  990 :
 1000 DEF FNequs(b$)
 1010 $P%=b$
 1020 P%=P%+LEN(b$)
 1030 =pass
 1040 :
 1050 DEF PROCoscli(stri
ng$)
 1060 DIM X% &FF
 1070 Y%=X% DIV 256
 1080 $X%=string$
 1090 CALL &FFF7
 1100 ENDPROC
```

Listing 2. Screen cut & paste

```
   10 REM Copy screen bl
ock
   20 REM by Steven Hank
in
   30 REM for B/B+/E/M/C
/A
   40 REM (c) Acorn User
 July 1988
   50 :
   60 MODE 1
   70 c=0
   80 FOR i=0 TO 2*PI ST
EP 0.05
   90 MOVE 640,512
  100 GCOL 0,c+1
  110 c=(c+1) MOD 3
  120 DRAW 640+500*COSi,
512+400*SINi
  130 NEXT
  140 PROCcopy(550,400,7
50,600,100,100)
  150 END
  160 :
  170 DEF PROCcopy(st%,s
tt%,x2%,y2%,x1%,y1%)
  180 oldx%=x1%
  190 FOR y%=stt% TO y2%
 STEP 4
  200 FOR x%=st% TO x2%
 STEP 4
  210 a%=POINT(x%,y%)
  220 x1%=x1%+4
  230 GCOL 0,a%
  240 PLOT 69,x1%,y1%
  250 NEXT
  260 y1%=y1%+4
  270 x1%=oldx%
  280 NEXT
  290 ENDPROC
```

Listing 3. Upside down characters

```
   10 REM Upside Down
   20 REM by Garry Smith
   30 REM for B/B+/E/M/C
   40 REM (c) Acorn User
 July 88
   50 :
   60 MODE 6
   70 DIM M% 100
   80 :
   90 oswrch=&FFEE
  100 FOR pass=0 TO 3 ST
EP 3
  110 P%=M%
  120 [OPT pass
  130 .char
  140 LDA &601
  150 STA &70
  160 LDA &602
  170 STA &71
  180 LDY #0
  190 LDA (&70),Y
  200 PHA
  210 STA &70
  220 LDX #&70
  230 LDA #10
  240 JSR &FFF1
  250 LDX #0
  260 .reverse
  270 LDY #8
  280 .loop
  290 ASL &71,X
  300 ROR &70,X
  310 DEY
  320 BNE loop
  330 INX
  340 CPX #8
  350 BNE reverse
  360 LDA #23
  370 JSR oswrch
  380 PLA
  390 JSR oswrch
  400 LDY #7
  410 .loop2
  420 LDA &70,Y
  430 JSR &FFEE
  440 DEY
  450 BPL loop2
  460 RTS
  470 ]
  480 NEXT
  490 :
  500 *FX 20,6
  510 FOR I%=33 TO 126
  520 VDU I%
  530 CALL char,I%
  540 VDU I%
  550 NEXT
```

See Joe's Jottings, page 50

◀ **Joe's Jottings listing 1 continued**

```
   10 REM Spreadsheet v1
   20 REM by Joe Telford
   30 REM for B+128/M/C
   40 REM (c) Acorn User July 1988
   50 :
   60 MODE 129
   70 PROCsetup
   80 movetype$=""
   90 CLS
  100 PROCshowwindow(0)
  110 PROCc1
  120 COLOUR 128
  130 COLOUR 2
  140 PRINT TAB(5,0)"The Joe's Jottings
 Spreadsheet!";
  150 COLOUR 1
  160 PRINT TAB(10,3)"Press SPACE to beg
in"
  170 REPEAT UNTIL GET=32
  180 ON ERROR PROCerr
  190 z%=&90A
  200 @%=&20209
  210 A%=FNmove
  220 f=0
  230 IF A%=ASC("T") A$(xp%,yp%)=CHR$34+
FNentertext(xp%,yp%):PROCc2:A(xp%,yp%)=0
:PROCdown(1):PROCc1:f=0:GOTO 460
  240 IF A%=ASC("N") A(xp%,yp%)=VAL(FNen
ternumber(xp%,yp%)):PROCc2:PROCdown(1):P
ROCc1:f=0:GOTO 460
  250 IF A%=ASC("F") THEN PROCenterformu
la:IF LEFT$(A$(xp%,yp%),1)<>CHR$34 AND A
$(xp%,yp%)>"" THEN A(xp%,yp%)=EVAL(A$(xp
%,yp%)):PROCc1:f=0:GOTO 460
  260 IF A%=ASC("R") THEN PROCreplicate:
f=1:GOTO 460
```

Continued ▶

◀ **Joe's Jottings listing 1 continued**

```
  270 IF A%=ASC("C") THEN PROCcat
  280 IF A%=ASC("S") THEN PROCsave
  290 IF A%=ASC("L") THEN PROCload
  300 IF A%=ASC("D") THEN PROCdelete
  310 IF A%=ASC("P") THEN PROCprintout
  320 IF A%=140 THEN recalcflag=1-recalc
flag:PROCrcmess
  330 IF A%=141 THEN f=1:GOTO 460
  340 IF A%=143 THEN PROCaddcol
  350 IF A%=144 THEN PROCaddrow
  360 IF A%=145 THEN PROCdelcol
  370 IF A%=146 THEN PROCdelrow
  380 IF A%=147 THEN PROCdelslot
  390 IF A%=149 THEN PROCnewsheet
  400 IF A%<>ASC("Q") THEN 180
  410 PROCmess("Do you really want to en
d? Y/N ")
  420 REPEAT A$=CHR$(GET AND 223):UNTIL
A$="Y" OR A$="N"
  430 IF A$="N" THEN 180
  440 MODE 128:END
  450 :
  460 IF recalcflag=FALSE AND f=0 THEN 1
80
  470 PROCbmess("Recalculating...")
  480 R%=0
  490 S%=0
  500 ON ERROR PROCcerr:GOTO 520
  510 IF A$(R%,S%)>"(" THEN A(R%,S%)=EVA
L(A$(R%,S%))
  520 R%=R%+1
  530 IF R%>max R%=0:S%=S%+1:IF S%>max T
HEN 550
  540 GOTO 510
  550 PROCshowwindow(lxp%)
  560 PROCc1
  570 ON ERROR OFF
  580 GOTO 180
  590 :
  600 DEF PROCcerr
  610 VDU 7
  620 IF ERR=17 THEN ENDPROC
  630 IF ERR=18 THEN A(R%,S%)=999999999:
ENDPROC
  640 IF ERR=20 THEN A$(R%,S%)=CHR$34+"<
Too big>":ENDPROC
  650 PROCmess("")
  660 PRINT TAB(0,0);:REPORT:PRINT " at
line ";ERL
  670 END
  680 :
  690 DEF PROCreplicate
  700 PROCmess(""):PRINT TAB(0,0);"Pleas
e move to the start"'"Of the slots to re
plicate"'"and press RETURN"
  710 movetype$="R"
  720 REPEAT A%=FNmove:UNTIL A%=13
  730 sx1=xp%:sy1=yp%
  740 PROCmess(""):PRINT TAB(0,0);"Now m
ove to the end"'"Of the slots to replica
te"'"and press RETURN"
  750 movetype$="R"
  760 REPEAT A%=FNmove:UNTIL A%=13
  770 sx2=xp%:sy2=yp%
  780 IF sx2<>sx1 AND sy1<>sy2 THEN VDU
7:PROCmess("Sorry - can't replicate from
 a block"):A$=INKEY$(300):PROCmess(""):E
NDPROC
  790 IFsx1=sx2 AND sy1=sy2 THEN S$="S"
  800 IFsx1=sx2 AND sy1<>sy2 THEN S$="C"
  810 IFsx1<>sx2 AND sy1=sy2 THEN S$="R"
  820 PROCmess(""):PRINT TAB(0,0);"Pleas
e move to the start"'"Of the slots you w
ant to "'"copy into and press RETURN"
  830 movetype$="R"
  840 REPEAT A%=FNmove:UNTIL A%=13
  850 dx1=xp%:dy1=yp%
  860 PROCmess(""):PRINT TAB(0,0);"Pleas
e move to the end"'"Of the slots you wan
t to "'"copy into and press RETURN"
  870 movetype$="R"
  880 REPEAT A%=FNmove:UNTIL A%=13
  890 dx2=xp%:dy2=yp%
  900 movetype$=""
  910 IF dx2<>dx1 AND dy1<>dy2 THEN VDU
7:PROCmess("Sorry - can't replicate to a
 block"):A$=INKEY$(300):PROCmess(""):END
PROC
  920 IFdx1=dx2 AND dy1=dy2 THEN D$="S"
  930 IFdx1=dx2 AND dy1<>dy2 THEN D$="C"
  940 IFdx1<>dx2 AND dy1=dy2 THEN D$="R"
  950 IF S$="C" AND D$="R" THEN VDU 7:PR
OCmess("Can't replicate a column to a ro
w!"):A$=INKEY$(300):PROCmess(""):ENDPROC
  960 IF S$="C" AND D$="S" THEN VDU 7:PR
OCmess("Can't replicate a column to a sl
ot!"):A$=INKEY$(300):PROCmess(""):ENDPRO
C
  970 IF S$="R" AND D$="C" THEN VDU 7:PR
OCmess("Can't replicate a row to a colum
n!"):A$=INKEY$(300):PROCmess(""):ENDPROC
  980 IF S$="R" AND D$="S" THEN VDU 7:PR
OCmess("Can't replicate a row to a slot!
"):A$=INKEY$(300):PROCmess(""):ENDPROC
  990 IF sx1>sx2 THEN sp=sx1:sx1=sx2:sx2
=sp
 1000 IF dx1>dx2 THEN sp=dx1:dx1=dx2:dx2
=sp
 1010 IF sy1>sy2 THEN sp=sy1:sy1=sy2:sy2
=sp
 1020 IF dy1>dy2 THEN sp=dy1:dy1=dy2:dy2
=sp
 1030 IF S$="R" AND D$="R" AND (sx2-sx1)
<>(dx2-dx1) THEN VDU 7:PROCmess("Start &
 End rows of different size"):A$=INKEY$(
300):PROCmess(""):ENDPROC
 1040 IF S$="C" AND D$="C" AND (sy2-sy1)
<>(dy2-dy1) THEN VDU 7:PROCmess("Start &
 End columns of different size"):A$=INKE
Y$(300):PROCmess(""):ENDPROC
 1050 ty$=S$+D$
 1060 IF ty$="CC" AND dy1>=sy1 AND dy1<=
sy2 AND sx1=dx1 THEN VDU 7:PROCmess("Col
umn replication overlaps!"):A$=INKEY$(30
0):PROCmess(""):ENDPROC
 1070 IF ty$="RR" AND dx1>=sx1 AND dx1<=
sx2 AND sy1=dy1 THEN VDU 7:PROCmess("Row
 replication overlaps!"):A$=INKEY$(300):
PROCmess(""):ENDPROC
 1080 IF S$="S" THEN PROCmess("Do you wi
sh to alter formulas? (Y/N)"):REPEAT FA$
=CHR$(GET AND 223):UNTIL FA$="Y" OR FA$=
"N"
 1090 PROCmess("Please wait... Replicati
ng...")
 1100 IF S$="S" AND D$="S" THEN PROCsrow
(sx1,sy1,dx1,dy1,0)
 1110 IF S$="S" AND D$="R" THEN PROCsrow
(sx1,sy1,dx1,dy1,dx2-dx1)
 1120 IF S$="S" AND D$="C" THEN PROCscol
(sx1,sy1,dx1,dy1,dy2-dy1)
 1130 IF S$="R" THEN PROCrrow(sx1,sy1,dx
1,dy1,sx2-sx1)
 1140 IF S$="C" THEN PROCccol(sx1,sy1,dx
1,dy1,sy2-sy1)
 1150 PROCmess("")
```

Continued ▶

◀ **Joe's Jottings listing 1 continued**

```
 1160 ENDPROC
 1170 :
 1180 DEF PROCsrow(sx,sy,dx,dy,L)
 1190 LOCAL loop%
 1200 FOR loop%=0 TO L
 1210 IF A$(sx,sy)="" THEN A$(dx+loop%,d
y)="":A(dx+loop%,dy)=A(sx,sy)
 1220 IF (A$(sx,sy)>"" AND FA$="N") OR L
EFT$(A$(sx,sy),1)=CHR$34 THEN A$(dx+loop
%,dy)=A$(sx,sy):A(dx+loop%,dy)=0
 1230 IF FA$="Y" AND A$(sx,sy)>"(" THEN
A$(dx+loop%,dy)=FNupdate(A$(sx,sy),1,0,l
oop%+(dx-sx))
 1240 NEXT
 1250 ENDPROC
 1260 :
 1270 DEF PROCscol(sx,sy,dx,dy,L)
 1280 LOCAL loop%
 1290 FOR loop%=0 TO L
 1300 IF A$(sx,sy)="" THEN A$(dx,dy+loop
%)="":A(dx,dy+loop%)=A(sx,sy)
 1310 IF (A$(sx,sy)>"" AND FA$="N") OR L
EFT$(A$(sx,sy),1)=CHR$34 THEN A$(dx,dy+l
oop%)=A$(sx,sy):A(dx,dy+loop%)=0
 1320 IF FA$="Y" AND A$(sx,sy)>"(" THEN
A$(dx,dy+loop%)=FNupdate(A$(sx,sy),0,1,(
dy-sy)+loop%)
 1330 NEXT
 1340 ENDPROC
 1350 :
 1360 DEF PROCrrow(sx,sy,dx,dy,L)
 1370 LOCAL loop%
 1380 FOR loop%=0 TO L
 1390 IF A$(sx+loop%,sy)="" THEN A$(dx+l
oop%,dy)="":A(dx+loop%,dy)=A(sx+loop%,sy
)
 1400 IF LEFT$(A$(sx+loop%,sy),1)=CHR$34
 THEN A$(dx+loop%,dy)=A$(sx+loop%,sy):A(
dx+loop%,dy)=0
 1410 IF A$(sx+loop%,sy)>"(" THEN A$(dx+
loop%,dy)=A$(sx+loop%,sy)
 1420 NEXT
 1430 ENDPROC
 1440 :
 1450 DEF PROCccol(sx,sy,dx,dy,L)
 1460 LOCAL loop%
 1470 FOR loop%=0 TO L
 1480 IF A$(sx,sy+loop%)="" THEN A$(dx,d
y+loop%)="":A(dx,dy+loop%)=A(sx,sy+loop%
)
 1490 IF LEFT$(A$(sx,sy+loop%),1)=CHR$34
 THEN A$(dx,dy+loop%)=A$(sx,sy+loop%):A(
dx,dy+loop%)=0
 1500 IF A$(sx,sy+loop%)>"(" THEN A$(dx,
dy+loop%)=A$(sx,sy+loop%)
 1510 NEXT
 1520 ENDPROC
 1530 :
 1540 DEF FNupdate(s$,x,y,d)
 1550 LOCAL t$,b$,loop%
 1560 t$=""
 1570 loop%=0
 1580 REPEAT
 1590 loop%=loop%+1
 1600 b$=MID$(s$,loop%,1)
 1610 IF b$<>"A" THEN t$=t$+b$
 1620 IF b$="A" THEN t$=t$+b$+FNcbracks(
x,y,d)
 1630 UNTIL loop%=LENs$
 1640 =t$
 1650 :
 1660 DEF FNcbracks(x,y,d)
 1670 LOCAL joop%,b$,t$,end,comma,xv,yv
 1680 b$=MID$(s$,loop%+1,1)
 1690 IF b$<>"(" THEN =""
 1700 t$=MID$(s$,loop%+2,255)
 1710 end=INSTR(t$,")")
 1720 comma=INSTR(t$,",")
 1730 xv=VAL(LEFT$(t$,comma-1))
 1740 yv=VAL(MID$(t$,comma+1,end-(comma+
1)))
 1750 IF x=1 THEN xv=xv+d
 1760 IF y=1 THEN yv=yv+d
 1770 b$="("+STR$(xv)+","+STR$(yv)+")"
 1780 loop%=loop%+end+1
 1790 =b$
 1800 :
 1810 DEF PROCerr
 1820 VDU 7
 1830 IF ERR=18 THEN A(xp%,yp%)=99999999
9:PROCmess("I can't divide by 0"):A$=INK
EY$(300):PROCmess(""):PROCc1:ENDPROC
 1840 IF ERR=20 THEN A$(xp%,yp%)=CHR$(34
)+"<Too big>":PROCmess("I can't handle n
umbers that big"):A$=INKEY$(300):PROCmes
s(""):PROCc1:ENDPROC
 1850 IF ERR=26 THEN A$(xp%,yp%)=CHR$34+
"?Formula?":PROCmess("I can't evaluate t
hat formula"):A$=INKEY$(300):PROCmess(""
):PROCc1:ENDPROC
 1860 IF ERR=17 THEN movetype$="":PROCc1
:PROCmess("Last action cancelled!..Pleas
e continue."):A$=INKEY$(300):PROCmess(""
):ENDPROC
 1870 IF ERR=190 THEN PROCc1:PROCmess("C
an't save:cat full - change disc!"):A$=I
NKEY$(300):PROCmess(""):ENDPROC
 1880 IF ERR=179 THEN PROCc1:PROCmess("C
an't save:dir full - change disc!"):A$=I
NKEY$(300):PROCmess(""):ENDPROC
 1890 IF ERR=198 THEN PROCc1:PROCmess("C
an't save:disc full - change disc!"):A$=
INKEY$(300):PROCmess(""):ENDPROC
 1900 PROCmess("")
 1910 PRINT TAB(0,0);:REPORT:PRINT;ERR;"
 at line "ERL;:
 1920 VDU 7
 1930 A$=INKEY$(500)
 1940 ENDPROC
 1950 :
 1960 DEF PROCnewsheet
 1970 PROCmess("Do you really want a new
 sheet? Y/N")
 1980 REPEAT A$=CHR$(GET AND 223):UNTIL
A$="Y" OR A$="N"
 1990 IF A$="N" PROCmess(""):ENDPROC
 2000 RUN
 2010 :
 2020 DEF PROCaddcol
 2030 LOCAL x,y,A$
 2040 PROCmess("Insert blank column? Y/N
")
 2050 REPEAT A$=CHR$(GET AND 223):UNTIL
A$="Y" OR A$="N"
 2060 IF A$="N" PROCmess(""):ENDPROC
 2070 PROCmess("Please wait...")
 2080 IF xp%=max THEN 2150
 2090 FOR x=max-1 TO xp% STEP -1
 2100 FOR y=0 TO max
 2110 A$(x+1,y)=A$(x,y):A(x+1,y)=A(x,y)
 2120 IF A$(x+1,y)>"(" THEN A(x+1,y)=0:A
$(x+1,y)=CHR$34+"?Formula?"
 2130 NEXT
 2140 NEXT
 2150 FOR y=0 TO max
 2160 A(xp%,y)=0
```

Continued ▶

◀ Joe's Jottings listing 1 continued

```
2170 A$(xp%,y)=CHR$34
2180 NEXT
2190 PROCshowwindow(lxp%)
2200 PROCc1
2210 ENDPROC
2220 :
2230 DEF PROCdelcol
2240 LOCAL x,y,A$
2250 PROCmess("Delete this column? Y/N"
)
2260 REPEAT A$=CHR$(GET AND 223):UNTIL
A$="Y" OR A$="N"
2270 IF A$="N" PROCmess(""):ENDPROC
2280 PROCmess("Please wait...")
2290 IF xp%=max THEN 2360
2300 FOR x=xp% TO max-1
2310 FOR y=0 TO max
2320 A$(x,y)=A$(x+1,y):A(x,y)=A(x+1,y)
2330 IFA$(x,y)>"(" THEN A(x,y)=0:A$(x,y
)=CHR$34+"?Formula?"
2340 NEXT
2350 NEXT
2360 FOR y=0 TO max
2370 A(max,y)=0
2380 A$(max,y)=CHR$34
2390 NEXT
2400 PROCshowwindow(lxp%)
2410 PROCc1
2420 ENDPROC
2430 :
2440 DEF PROCaddrow
2450 LOCAL x,y,A$
2460 PROCmess("Insert blank row? Y/N")
2470 REPEAT A$=CHR$(GET AND 223):UNTIL
A$="Y" OR A$="N"
2480 IF A$="N" PROCmess(""):ENDPROC
2490 PROCmess("Please wait...")
2500 IF yp%=max THEN 2570
2510 FOR y=max-1 TO yp% STEP -1
2520 FOR x=0 TO max
2530 A$(x,y+1)=A$(x,y):A(x,y+1)=A(x,y)
2540 IF A$(x,y+1)>"(" THEN A(x,y+1)=0:A
$(x,y+1)=CHR$34+"?Formula?"
2550 NEXT
2560 NEXT
2570 FOR x=0 TO max
2580 A(x,yp%)=0
2590 A$(x,yp%)=CHR$34
2600 NEXT
2610 PROCshowwindow(lxp%)
2620 PROCc1
2630 ENDPROC
2640 :
2650 DEF PROCdelrow
2660 LOCAL x,y,A$
2670 PROCmess("Delete this row? Y/N")
2680 REPEAT A$=CHR$(GET AND 223):UNTIL
A$="Y" OR A$="N"
2690 IF A$="N" PROCmess(""):ENDPROC
2700 PROCmess("Please wait...")
2710 IF yp%=max THEN 2780
2720 FOR y=yp% TO max-1
2730 FOR x=0 TO max
2740 A$(x,y)=A$(x,y+1):A(x,y)=A(x,y+1)
2750 IF A$(x,y)>"(" THEN A(x,y)=0:A$(x,
y)=CHR$34+"?Formula?"
2760 NEXT
2770 NEXT
2780 FOR x=0 TO max
2790 A(x,max)=0
2800 A$(x,max)=CHR$34
2810 NEXT
2820 PROCshowwindow(lxp%)
2830 PROCc1
2840 ENDPROC
2850 :
2860 DEF PROCdelslot
2870 A$(xp%,yp%)=CHR$34
2880 A(xp%,yp%)=0
2890 PROCc1
2900 f=0
2910 GOTO 460
2920 ENDPROC
2930 :
2940 DEF PROCprintout
2950 LOCAL x,y,xend,yend,xx
2960 movetype$="P"
2970 PROCmess("move to bottom right cel
l-press RETURN")
2980 REPEAT A%=FNmove:UNTIL A%=13
2990 movetype$=""
3000 xend=xp%:yend=yp%
3010 PROCmess("Spreadsheet or Contents?
S/C")
3020 REPEAT A$=CHR$(GET AND 223):UNTIL
A$="S" OR A$="C"
3030 IF A$="C" PROCcontents(xend,yend):
ENDPROC
3040 PROCmess("Do you want columns? Y/N
")
3050 REPEAT A$=CHR$(GET AND 223):UNTIL
A$="Y" OR A$="N"
3060 colchar$="|"
3070 IF A$="N" colchar$=" "
3080 PROCreadyp
3090 IF xend<=12 THEN PROCprintit(0,xen
d,yend) ELSE PROCprintit(0,12,yend)
3100 IF xend>12 THEN PROCprintit(13,xen
d,yend)
3110 PROCmess("")
3120 ENDPROC
3130 :
3140 DEF PROCreadyp
3150 PROCmess("Ready printer and press
RETURN")
3160 REPEAT UNTIL GET=13
3170 PROCmess("PRINTING")
3180 ENDPROC
3190 :
3200 DEF PROCcontents(ex,ey)
3210 PROCreadyp
3220 *FX 3,10
3230 VDU 2,1,15
3240 PRINT " Cell|Type|  Contents"
3250 PRINT "-----|----|----------------
-"
3260 FOR x=0 TO xend
3270 FOR y=0 TO yend
3280 @%=z%
3290 IF x<10 PRINT" ";
3300 PRINT ;x;",";
3310 IF y<10 PRINT" ";
3320 PRINT ;y;"| ";
3330 IF A$(x,y)="" THEN PRINT "N  | ";A
(x,y):GOTO 3370
3340 IF A$(x,y)=CHR$34 THEN PRINT "   |
Blank":GOTO 3370
3350 IF LEFT$(A$(x,y),1)=CHR$34 THEN PR
INT "T  | ";MID$(A$(x,y),2,LENA$(x,y))
3360 IF LEFT$(A$(x,y),1)>CHR$34 THEN PR
INT "F  | ";A$(x,y)
3370 NEXT
3380 VDU 3
3390 *FX 3,4
3400 @%=&20209
3410 ENDPROC
```

Continued ▶

◀ **Joe's Jottings listing 1 continued**

```
3420 :
3430 DEF PROCcat
3440 COLOUR 3
3450 COLOUR 128
3460 CLS
3470 PRINT
3480 *DIR S
3490 *CAT
3500 *DIR $
3510 PROCmess("files available:- ")
3520 PRINT TAB(0,1)"Press space to retu
rn"
3530 REPEAT UNTIL GET=32
3540 CLS
3550 PROCshowwindow(lxp%)
3560 PROCc1
3570 ENDPROC
3580 :
3590 DEF PROCdelete
3600 REPEAT
3610 PROCmess("delete file:- ")
3620 f$=FNgpi(7,0,cap$+low$+nos$)
3630 IF f$="" THEN PROCcat
3640 UNTIL f$>""
3650 ch%=OPENUP("S."+f$)
3660 CLOSE #ch%
3670 IF ch%=0 THEN PROCmess("Can't find
that file."):A$=INKEY$(500):PROCmess(""
):ENDPROC
3680 OSCLI("REMOVE S."+f$)
3690 OSCLI("REMOVE N."+f$)
3700 PROCmess("Deleted!")
3710 A$=INKEY$(300)
3720 PROCmess("")
3730 ENDPROC
3740 :
3750 DEF PROCsave
3760 REPEAT
3770 PROCmess("Save as filename:- ")
3780 f$=FNgpi(7,0,cap$+low$+nos$)
3790 IF f$="" THEN PROCcat
3800 UNTIL f$>""
3810 ch%=OPENUP("S."+f$)
3820 IF ch%<>0 THEN CLOSE#ch%:PROCmess(
"That file exists"):A$=INKEY$(500):PROCm
ess(""):ENDPROC
3830 ch%=OPENOUT("S."+f$)
3840 PROCmess("Saving..... please wait"
)
3850 FOR x=0 TO max
3860 FOR y=0 TO max
3870 PRINT# ch%,A$(x,y)
3880 NEXT
3890 NEXT
3900 CLOSE# ch%
3910 ch%=OPENOUT("N."+f$)
3920 FOR x=0 TO max
3930 FOR y=0 TO max
3940 PRINT# ch%,A(x,y)
3950 NEXT
3960 NEXT
3970 CLOSE# ch%
3980 PROCmess("Saved!")
3990 A$=INKEY$(300)
4000 PROCmess("")
4010 ENDPROC
4020 :
4030 DEF PROCload
4040 REPEAT
4050 PROCmess("load filename:- ")
4060 f$=FNgpi(7,0,cap$+low$+nos$)
4070 IF f$="" THEN PROCcat
4080 UNTIL f$>""
4090 ch%=OPENUP("S."+f$)
4100 IF ch%=0 THEN CLOSE# ch%:PROCmess(
"Can't find that file."):A$=INKEY$(500):
PROCmess(""):ENDPROC
4110 PROCmess("Loading..... please wait
")
4120 FOR x=0 TO max
4130 FOR y=0 TO max
4140 INPUT# ch%,A$(x,y)
4150 NEXT
4160 NEXT
4170 CLOSE# ch%
4180 ch%=OPENUP("N."+f$)
4190 FOR x=0 TO max
4200 FOR y=0 TO max
4210 INPUT# ch%,A(x,y)
4220 NEXT
4230 NEXT
4240 CLOSE# ch%
4250 xp%=0:yp%=0
4260 lxp%=0
4270 PROCshowwindow(0)
4280 PROCc1
4290 ENDPROC
4300 :
4310 DEF PROCbmess(t$)
4320 COLOUR 2
4330 COLOUR 128
4340 PRINT TAB(0,31);STRING$(39," ");
4350 PRINT TAB(0,31);t$;
4360 ENDPROC
4370 :
4380 DEF PROCprintit(sx,ex,ey)
4390 *FX 3,10
4400 VDU 2,1,15
4410 PRINT
4420 PRINT "--";
4430 FOR x=sx TO ex
4440 PRINT "!-";LEFT$(col$(x),8);
4450 NEXT
4460 PRINT
4470 FOR y=0 TO yend
4480 VDU 1,15
4490 IF y<10 PRINT" ";
4500 @%=z%
4510 PRINT ;y;
4520 @%=&20209
4530 FOR x=sx TO ex
4540 PRINT colchar$;
4550 IF LEFT$(A$(x,y),1)<>CHR$34 THEN P
RINT A(x,y);:GOTO 4580
4560 IF A$(x,y)=CHR$34 THEN PRINT SPC(9
);:GOTO 4580
4570 IF A$(x,y)>CHR$34 THEN PRINT MID$(
A$(x,y),2,LENA$(x,y));SPC(10-LEN(A$(x,y)
)); ELSE PRINT A(x,y);
4580 NEXT
4590 PRINT
4600 NEXT
4610 VDU 3
4620 *FX 3,4
4630 ENDPROC
4640 :
4650 DEF PROCenterformula
4660 tx=xp%:ty=yp%
4670 window=nxp%
4680 movetype$="F"
4690 PROCmess("")
4700 PRINT TAB(0,0)"You want to enter a
 formula"'"into this box?"'"Please confi
rm. (Y/N) ";
4710 REPEAT A$=CHR$(GET AND 223):UNTIL
A$="Y" OR A$="N"
```

Continued ▶

JOE'S JOTTINGS

◀ **Joe's Jottings listing 1 continued**

```
4720 PRINT A$
4730 PROCmess("")
4740 IF A$="N" THEN ENDPROC
4750 buffer1$=""
4760 PRINT TAB(0,0)"Formula := ";
4770 REPEAT
4780 A%=FNmove
4790 IF A%=135 THEN PROCaddtobuffers(xp
%,yp%):UNTIL 0
4800 A$=CHR$(A%)
4810 IF INSTR(cap$+"+-/*0123456789.()"+
CHR$(13)+CHR$127,A$)<1 THEN UNTIL 0
4820 IF A%<>13 THEN PROCaddbuffers(A$)
4830 UNTIL A%=13
4840 PROCmess("")
4850 movetype$=""
4860 A$(tx,ty)=buffer1$
4870 IF window=nxp% THEN PROCc2:ELSE nx
p%=window:PROCshowwindow(nxp%):lxp%=nxp%
4880 xp%=tx:yp%=ty
4890 PROCc1
4900 ENDPROC
4910 :
4920 DEF PROCaddbuffers(a$)
4930 IF a$=CHR$(127) THEN buffer1$=LEFT
$(buffer1$,LEN(buffer1$)-1):ELSE:buffer1
$=buffer1$+a$
4940 PROCshowbuffer1
4950 ENDPROC
4960 :
4970 DEF PROCaddtobuffers(x,y)
4980 buffer1$=buffer1$+"A("+STR$x+","+S
TR$y+")"
4990 PROCshowbuffer1
5000 ENDPROC
5010 :
5020 DEF PROCshowbuffer1
5030 COLOUR 128
5040 COLOUR 3
5050 PROCmess("Formula := "+buffer1$)
5060 ENDPROC
5070 :
5080 DEF FNentertext(x,y)
5090 COLOUR 0
5100 COLOUR 131
5110 PRINT TAB((x MOD 4)*9+4,y+6);SPC(9
);TAB((x MOD 4)*9+4,y+6);
5120 A(x,y)=0
5130 =FNgpi(9,0,all$)
5140 :
5150 DEF PROCmess(t$)
5160 COLOUR 128
5170 COLOUR 3
5180 PRINT TAB(0,0);STRING$(200," ");
5190 PRINT TAB(0,0);t$;
5200 ENDPROC
5210 :
5220 DEF FNenternumber(x,y)
5230 COLOUR 0
5240 COLOUR 129
5250 PRINT TAB((x MOD 4)*9+4,y+6);SPC(9
);TAB((x MOD 4)*9+4,y+6);
5260 A$(x,y)=""
5270 =FNgpi(9,0,nos$)
5280 :
5290 DEF PROCshowwindow(nxp%)
5300 COLOUR 3
5310 COLOUR 128
5320 PROCdrawaxes(nxp%*4,0)
5330 PROCdrawwindow(nxp%*4,0)
5340 ENDPROC
5350 :
5360 DEF PROCdrawaxes(x,y)
5370 PRINT TAB(0,5);"JJ*!";
5380 FOR loop%=x TO x+3
5390 PRINT col$(loop%);
5400 NEXT
5410 FOR loop%=y TO y+24
5420 PRINT TAB(0,loop%-y+6);row$(loop%)
5430 NEXT
5440 PROCrcmess
5450 ENDPROC
5460 :
5470 DEF PROCrcmess
5480 IF recalcflag=0 PROCbmess("Manual
Recalc"):ELSE PROCbmess("Auto Recalc")
5490 ENDPROC
5500 :
5510 DEF PROCdrawwindow(x,y)
5520 LOCAL yl%,xl%,d$
5530 VDU 28,4,30,39,6,12,26
5540 COLOUR 128
5550 FOR yl%=0 TO 24
5560 FOR xl%=0 TO 3
5570 PRINT TAB(4+xl%*9,yl%+6);
5580 IF LEFT$(A$(x+xl%,yl%),1)=CHR$34 T
HEN COLOUR 3:PRINT MID$(A$(x+xl%,yl%),2,
9);:NEXT:NEXT:ENDPROC
5590 IF LEFT$(A$(x+xl%,yl%),1)<>CHR$34
AND A$(x+xl%,yl%)>"" THEN COLOUR 2:ELSE
COLOUR 1
5600 PRINT A(x+xl%,yl%);:NEXT:NEXT:ENDP
ROC
5610 :
5620 DEF PROCc1
5630 COLOUR 0
5640 IF LEFT$(A$(xp%,yp%),1)=CHR$(34) T
HEN COLOUR 131:PRINT TAB((xp% MOD 4)*9+4
,yp%+6);SPC(9);TAB((xp% MOD 4)*9+4,yp%+6
);MID$(A$(xp%,yp%),2,9);:ENDPROC
5650 IF LEFT$(A$(xp%,yp%),1)<>CHR$34 AN
D A$(xp%,yp%)>"" THEN COLOUR 130:PRINT T
AB((xp% MOD 4)*9+4,yp%+6);SPC(9);TAB((xp
% MOD 4)*9+4,yp%+6)A(xp%,yp%);:ENDPROC
5660 COLOUR 129:PRINTTAB((xp% MOD 4)*9+
4,yp%+6);SPC(9);TAB((xp% MOD 4)*9+4,yp%+
6)A(xp%,yp%);:ENDPROC
5670 :
5680 DEF PROCc2
5690 COLOUR 128
5700 PRINT TAB((xp% MOD 4)*9+4,yp%+6);S
PC(9);
5710 PRINT TAB((xp% MOD 4)*9+4,yp%+6);
5720 IF LEFT$(A$(xp%,yp%),1)=CHR$34 THE
N COLOUR 3:PRINT MID$(A$(xp%,yp%),2,9);:
ENDPROC
5730 IF LEFT$(A$(xp%,yp%),1)<>CHR$34 AN
D A$(xp%,yp%)>"" THEN COLOUR 2:ELSE COLO
UR 1
5740 PRINT A(xp%,yp%);
5750 ENDPROC
5760 :
5770 DEF FNmove
5780 *FX 4,1
5790 IF movetype$="" THEN PROCfshow
5800 A%=GET
5810 B%=1
5820 IF INKEY-1 THEN B%=2
5830 IF INKEY-2 THEN B%=3
5840 PROCc2
5850 IF A%=139 THEN PROCup(B%)
5860 IF A%=138 THEN PROCdown(B%)
5870 IF A%=136 THEN PROCleft(B%)
5880 IF A%=137 THEN PROCright(B%)
5890 PROCc1
5900 *FX 4,0
```

Continued ▶

JOE'S JOTTINGS

◀ **Joe's Jottings listing 1 continued**

```
5910 =A%
5920 :
5930 DEF PROCfshow
5940 IF LEFT$(A$(xp%,yp%),1)<>CHR$34 AND A$(xp%,yp%)>"" THEN PROCmess("Formula := "+A$(xp%,yp%)):ELSE PROCmess("")
5950 ENDPROC
5960 :
5970 DEF PROCup(b)
5980 IF b=3 THEN yp%=0:ENDPROC
5990 IF b=2 THEN yp%=yp%-4 ELSE yp%=yp%-1
6000 IF yp%<0 THEN yp%=0
6010 ENDPROC
6020 :
6030 DEF PROCdown(b)
6040 IF b=3 THEN yp%=max:ENDPROC
6050 IF b=2 THEN yp%=yp%+4 ELSE yp%=yp%+1
6060 IF yp%>max THEN yp%=max
6070 ENDPROC
6080 :
6090 DEF PROCleft(b)
6100 IF b=3 THEN xp%=0:nxp%=0
6110 IF (b=3) AND (lxp%=nxp%) THEN ENDPROC
6120 IF (b=3) AND (lxp%<>nxp%) PROCshowwindow(nxp%):lxp%=nxp%:ENDPROC
6130 IF b=2 THEN xp%=xp%-4:ELSE xp%=xp%-1
6140 IF xp%<0 THEN xp%=0
6150 nxp%=(xp% DIV 4)
6160 IF lxp%=nxp% THEN ENDPROC
6170 PROCshowwindow(nxp%)
6180 lxp%=nxp%
6190 ENDPROC
6200 :
6210 DEF PROCright(b)
6220 IF b=3 THEN xp%=max:nxp%=xp% DIV 4
6230 IF (b=3) AND (lxp%=nxp%) THEN ENDPROC
6240 IF (b=3) AND (lxp%<>nxp%) PROCshowwindow(nxp%):lxp%=nxp%:ENDPROC
6250 IF b=2 THEN xp%=xp%+4 ELSE xp%=xp%+1
6260 IF xp%>max THEN xp%=max
6270 nxp%=(xp% DIV 4)
6280 IF lxp%=nxp% THEN ENDPROC
6290 PROCshowwindow(nxp%)
6300 lxp%=nxp%
6310 ENDPROC
6320 :
6330 DEF FNgpi(len,effect,valid$)
6340 LOCAL a$,b
6350 a$=""
6360 PRINT STRING$(len,".");STRING$(len,CHR$(8));
6370 *FX20,1
6380 b=GET
6390 IF b=13 THEN =a$
6400 IF b=127 AND a$="" THEN 6380
6410 IF b=127 a$=LEFT$(a$,LEN(a$)-1):PRINT CHR$b;".";CHR$(8);:GOTO 6380
6420 IF effect=0 THEN 6450
6430 IF effect=1 b=b AND 223 ELSE b=b OR 32
6440 IF effect=3 AND(RIGHT$(a$,1)=" " OR a$="") b=b AND 223
6450 IF LEN(a$)=len OR INSTR(valid$,CHR$b)=0 VDU 7:GOTO 6380
6460 PRINT CHR$b;
6470 a$=a$+CHR$b
6480 GOTO 6380
6490 :
6500 DEF PROCvalid
6510 cap$=" ABCDEFGHIJKLMNOPQRSTUVWXYZ"
6520 low$=" abcdefghijklmnopqrstuvwxyz"
6530 nos$="-.0123456789"
6540 pun$=" _^[]}{!#$%&'()=?/*:+;.,<>"+CHR$34
6550 all$=cap$+low$+nos$+pun$
6560 ENDPROC
6570 :
6580 DEF PROCsetup
6590 max=24
6600 DIM A$(max+4,max),col$(max+4),row$(max),A(max,max)
6610 FOR xloop%=0 TO max+4
6620 FOR yloop%=0 TO max
6630 A$(xloop%,yloop%)=CHR$(34)
6640 NEXT
6650 NEXT
6660 FOR loop%=0 TO 9
6670 col$(loop%)="-Col  "+STR$(loop%)+"--|"
6680 NEXT
6690 FOR loop%=10 TO max+4
6700 col$(loop%)="-Col  "+STR$(loop%)+"-|"
6710 NEXT
6720 FOR loop%=0 TO 9
6730 row$(loop%)=".."+STR$(loop%)+"|"
6740 NEXT
6750 FOR loop%=10 TO max
6760 row$(loop%)="."+STR$(loop%)+"|"
6770 NEXT
6780 xp%=0:yp%=0
6790 xmax%=0:ymax%=0
6800 lxp%=0
6810 z%=@%
6820 @%=&20209
6830 recalcflag=FALSE
6840 *KEY 0 T
6850 *KEY 1 N
6860 *KEY 2 F
6870 *KEY 3 R
6880 *KEY 4 C
6890 *KEY 5 S
6900 *KEY 6 L
6910 *KEY 7 D
6920 *KEY 8 P
6930 *KEY 9 Q
6940 *FX 226,140
6950 *FX 227,150
6960 PROCvalid
6970 ENDPROC
```

July listings

The easiest way to enter the listings is to buy the monthly listings disc or cassette. It saves time and avoids errors, especially with a long program. The disc is fully menu-driven and an excellent buy at only £5.95. The cassette version for the BBC micro and Electron contains a tape to disc transfer program and costs £3.95. The programs are also available on 3.5-inch disc for the Arc, Compact and Electron at £7.95, *see page 13 for details of how to order.*

The listings can also be downloaded from Micronet if you have a Micronet subscription (page 600 600 890A). The Acorn User *software can be downloaded just like any other programs from Prestel. Go to the first page by entering *600600890#. From there the operation is fully prompted. The charge for the software from Micronet is £5.00, so you can save money too.*

See Archimedes Agora, page 39

Listing 1. Setting system variables

```
   10 REM Agora - listing 1
   20 REM Key variables
   30 REM by Dave Acton
   40 REM for Archimedes only
   50 REM (c) Acorn User July 1988
   60 :
   70 MODE 6
   80 DIM block% 16
   90 PROCset("Left","to move left")
  100 PROCset("Right","to move right")
  110 PROCset("Up","to move up")
  120 PROCset("Down","to move down")
  130 PROCset("Fire","to fire")
  140 *SHOW Inkey$*
  150 *SHOW Key$*
  160 END
  170 :
  180 DEF PROCset(varname$,function$)
  190 PRINT"Which key do you want "funct
ion$"? ";
  200 pressed%=0
  210 *FX 15,1
  220 REPEAT
  230 key%=-1
  240 REPEAT
  250 IF INKEY(key%) pressed%=key%
  260 key%-=1
  270 UNTIL key%=-128
  280 ink$=INKEY$(0)
  290 UNTIL ink$>"" AND pressed%
  300 IF ink$=CHR$(13) ink$="Return"
  310 IF ink$=CHR$(32) ink$="Space Bar"
  320 PRINT ink$
  330 !block%=pressed%
  340 SYS "OS_SetVarVal","Inkey$"+varnam
e$,block%,4,0,1
  350 SYS "OS_SetVarVal","Key$"+varname$
,ink$,LEN(ink$),0,0
  360 REPEAT
  370 UNTIL NOT INKEY(pressed%)
  380 ENDPROC
```

Listing 2. Using system variables

```
   10 REM Agora - listing 2
   20 REM Key demonstration
   30 REM by Dave Acton
   40 REM for Archimedes only
   50 REM (c) Acorn User July 1988
   60 :
   70 MODE 9
   80 VDU 24,0;0;1279;679;
   90 OFF
  100 DIM block% 16
  110 PRINT'''
  120 left%=FNread("Left")
  130 right%=FNread("Right")
  140 up%=FNread("Up")
  150 down%=FNread("Down")
  160 fire%=FNread("Fire")
  170 REPEAT
  180 x%=640:y%=340
  190 misses%=0:score%=0
  200 spd%=8
  210 TIME=0
  220 REPEAT
  230 CLG
  240 tx%=0
  250 ty%=RND(200)+240
  260 targetrad%=RND(40)+40
  270 tdy%=RND(8)
  280 IF ty%>340 tdy%=-tdy%
  290 hit%=FALSE
  300 REPEAT
  310 WAIT
  320 PROCshow(0)
  330 tx%+=spd%/2
  340 ty%+=tdy%
  350 IF INKEY(left%) AND x%>0 x%-=spd%
  360 IF INKEY(right%) AND x%<1279 x%+=s
pd%
  370 IF INKEY(up%) AND y%<680 y%+=spd%
  380 IF INKEY(down%) AND y%>0 y%-=spd%
  390 PROCshow(misses% MOD 7+1)
  400 PRINTTAB(0,0)"Score: ";score%;"
"TAB(30,0)"Misses: ";misses%
  410 dist%=SQR((x%-tx%)^2+(y%-ty%)^2)
  420 IF INKEY(fire%) THEN
  430 IF dist%<targetrad% THEN
  440 hit%=TRUE
  450 score%+=spd%
  460 IF dist%<targetrad%/2 score%+=100
  470 ELSE
  480 IF score%>0 score%-=1
  490 ENDIF
  500 ENDIF
  510 IF TIME>400 THEN
  520 TIME=0
  530 IF spd%<32 spd%+=4
  540 ENDIF
  550 UNTIL POINT(tx%,ty%)<0 OR hit%
  560 IF NOT hit% misses%+=1
  570 UNTIL misses%=7
  580 PRINTTAB(8,20)"GAME OVER - press S
PACE"
  590 REPEAT UNTIL INKEY-99
  600 UNTIL FALSE
  610 :
  620 DEF PROCshow(c%)
  630 GCOL c%
  640 CIRCLE FILL tx%,ty%,targetrad%
  650 IF c% GCOL 7
  660 LINE x%-32,y%,x%+32,y%
  670 LINE x%,y%-32,x%,y%+32
  680 ENDPROC
  690 :
  700 DEF FNread(varname$)
  710 SYS "XOS_ReadVarVal","Key$"+varnam
e$,block%,-1 TO ,,exists%
  720 IF exists%>=0 ERROR 214,"Key$"+var
name$+" not found"
  730 SYS "XOS_ReadVarVal","Inkey$"+varn
ame$,block%,-1 TO ,,exists%
  740 IF exists%>=0 ERROR 214,"Inkey$"+v
arname$+" not found"
  750 SYS "XOS_ReadVarVal","Key$"+varnam
e$,block%,10,0,0 TO ,,len%
  760 block%?len%=13
  770 PRINTTAB(19-LEN(varname$))varname$
" :  "$block%
  780 SYS "XOS_ReadVarVal","Inkey$"+varn
ame$,block%,4,0,0
  790 =!block%
```

Listing 3. Configuration saver module

```
   10 REM Agora - listing 3
   20 REM Configuration Saver
   30 REM by P J Dellar
   40 REM for the Archimedes only.
   50 REM (c) Acorn User July 1988
   60 :
   70 MODE 3
   80 :
   90 DIM code% &100
  100 call=0
  110 offset=1
  120 byte=2
  130 ptr=3
  140 fname=4
  150 link=14
  160 :
  170 FOR pass%=0 TO 3 STEP 3
  180 P%=code%
  190 [OPT pass%
  200 MOV fname,offset
  210 MOV call,#161
  220 MOV offset,#1
  230 ADR ptr,data
  240 .saveloop
  250 ADD offset,offset,#1
  260 SWI "XOS_Byte"
  270 STRB byte,[ptr,#1]!
  280 CMP offset,#240
  290 BLT saveloop
  300 MOV r0,#&0A
  310 MOV r1,fname
  320 MVN r2,#&03
  330 ADR r4,loadcode
  340 ADR r5,(data+240)
  350 SWI "XOS_File"
  360 MOV pc,link
  370 :
  380 .loadcode
  390 MOV call,#162
  400 ADR ptr,data
  410 MOV offset,#1
  420 .loadloop
  430 LDRB byte,[ptr,#1]!
  440 ADD offset,offset,#1
  450 SWI "XOS_Byte"
  460 CMP offset,#240
  470 BLT loadloop
  480 MOV pc,link
  490 :
  500 .data
  510 ]
  520 NEXT pass%
  530 OSCLI("SAVE ConfigSave "+STR$~(cod
e%)+" "+STR$~(data))
  540 *SETTYPE ConfigSave FFC
  550 PRINT"Code saved as 'ConfigSave'."
  560 END
```

Listing 4. Disc compacter

```
   10 REM Agora - listing 4
   20 REM A 'real' *Compact
   30 REM by Stuart Turgis
   40 REM for Archimedes only
   50 REM (c) Acorn User July 1988
   60 :
   70 MODE 3
   80 :
   90 DIM code% 1000
  100 link=14
  110 sp=13
  120 :
  130 FOR pass%=0 TO 2 STEP 2
  140 P%=code%
  150 [OPT pass%
  160 .compact
  170 STMFD (sp)!,{R0-R12,link}
  180 .comp
  190 ADR R0,command
  200 SWI "OS_CLI"
  210 ADR R0,drive
  220 SWI "ADFS_FreeSpace"
  230 CMP R1,R0
  240 BNE comp
  250 LDMFD (sp)!,{R0-R12,pc}
  260 .command
  270 EQUS "*compact"
  280 EQUB 0
  290 .drive
  300 EQUS ":0"
  310 EQUB 0
  320 ]
  330 NEXT
  340 INPUT"Compact which Drive? "drive$
  350 $drive=drive$
  360 OSCLI("MOUNT "+drive$)
  370 CALL compact
  380 OSCLI("MAP "+drive$)
  390 END
```

See Music, page 65

Listing 1. File converter

```
   10 REM Island Logic / System Software
   20 REM Music System to AUTUMN File co
nverter
   30 REM by Richard Sheard
   40 REM For BBC B/B+
   50 REM (C) Acorn User April 1988
   60 :
   70 ON ERROR GOTO 5330
   80 *TV 255
   90 MODE 7
  100 himem%=HIMEM
  110 HIMEM=HIMEM-&2000
  120 autumn%=HIMEM
  130 DIM env%(15,13),notes%(4),ptr%(4),
pitch%(29)
  140 DIM keysig%(29),bar%(29),duration%
(16)
  150 DIM p%(3),d%(3),envel% 14
  160 PROCtitles
  170 REPEAT
  180 option%=FNmenu
  190 ON option% GOSUB 230,260,290,320
  200 UNTIL option%=4
  210 END
  220 :
  230 PROCconvert
```

Continued ▶

◀ Music listing 1 continued

```
240 RETURN
250 :
260 PROCenvelopes
270 RETURN
280 :
290 PROCruntms
300 RETURN
310 :
320 MODE 7
330 RETURN
340 :
350 DEF PROCdouble(a$,x%,y%,f%,b%)
360 LOCAL v%
370 IF x%<0 THEN x%=20-LEN(a$)/2
380 x%=x%-2+2*(b%<>0)
390 FOR v%=y% TO y%+1
400 PRINT TAB(x%,v%);CHR$(141);
410 IF b%<>0 THEN PRINT ;CHR$(b%+128);
CHR$(157);
420 PRINT ;CHR$(f%+128);a$;
430 IF b%<>0 THEN PRINT ;"  ";CHR$(156
) ELSE PRINT
440 NEXT
450 ENDPROC
460 :
470 DEF PROCtitles
480 VDU 23;8202;0;0;0;
490 PROCdouble("TMS"+CHR$(129)+"to"+CH
R$(132)+"AUTUMN",5,0,4,7)
500 PRINT TAB(21,0);CHR$(140);CHR$(130
);"By";CHR$(133);"R.M. Sheard"
510 PRINT TAB(1,2);CHR$(131);"Music Fi
le Converter"
520 VDU 28,0,24,39,3
530 ENDPROC
540 :
550 DEF FNmenu
560 CLS
570 PROCdouble("MENU",-1,2,6,0)
580 PRINT TAB(1,6);CHR$(130);"1.";CHR$
(133);"Convert TMS Music file to AUTUMN.
"
590 PRINT TAB(1,9);CHR$(130);"2.";CHR$
(133);"Extract envelope data from TMS";T
AB(5,10);CHR$(133);"Music file."
600 PRINT TAB(1,13);CHR$(130);"3.";CHR
$(133);"Enter The Music System."
610 PRINT TAB(1,16);CHR$(130);"4.";CHR
$(133);"Exit file converter program."
620 PRINT TAB(5,19);CHR$(129);"Select
option (1-4):";CHR$(131);
630 REPEAT
640 opt%=GET-48
650 UNTIL opt%>0 AND opt%<5
660 PRINT ;opt%
670 =opt%
680 :
690 DEF PROCconvert
700 CLS
710 PROCdouble("Convert TMS to AUTUMN"
,-1,2,6,0)
720 PROCgetfiles
730 PROCloadenvelopes
740 PROCinitialise
750 PROCkeysignature
760 PROCinfo
770 FOR v%=1 TO 3
780 ?(autumn%+(v%-1)*2)=(address%-autu
mn%) MOD 256
790 ?(autumn%+(v%-1)*2+1)=(address%-au
tumn%) DIV 256
800 PROCtmstoautumn(v%)
810 NEXT
820 CLOSE #music
830 PROCplaytune
840 PROCsavetune
850 ENDPROC
860 :
870 DEF PROCgetfiles
880 source$=FNinput(CHR$(134)+"Source
file:"+CHR$(129)+"m.",7,1,6)
890 source$="m."+source$
900 temp=OPENIN(source$)
910 CLOSE #temp
920 IF temp=0 THEN PROCerr(CHR$(133)+"
Music file '"+source$+"' not found",1,6)
:GOTO 880
930 IF FNcheck(source$,"IamMusic")=FAL
SE THEN PROCerr(CHR$(133)+"'"+source$+"'
 is not a TMS Music File",1,6):GOTO 880
940 object$=FNinput(CHR$(134)+"Object
file:"+CHR$(129)+"a.",7,1,9)
950 object$="a."+object$
960 temp=OPENIN(object$)
970 CLOSE #temp
980 IF temp<>0 THEN PROCerr(CHR$(133)+
"Filename '"+object$+"' already exists",
1,9):GOTO 940
990 envel$=FNinput(CHR$(134)+"Envelope
 file:"+CHR$(129)+"b.",7,1,12)
1000 IF envel$="def" THEN GOTO 1070
1010 envel$="b."+envel$
1020 temp=OPENIN(envel$)
1030 ext=EXT #temp
1040 CLOSE #temp
1050 IF temp=0 THEN PROCerr(CHR$(133)+"
Envelope file '"+envel$+"' not found",1,
12):GOTO 990
1060 IF ext<>240 THEN PROCerr(CHR$(133)
+"'"+envel$+"' is not an envelope file",
1,12):GOTO 990
1070 ENDPROC
1080 :
1090 DEF FNclr(x%,y%)
1100 PRINT TAB(x%,y%);STRING$(39-x%," "
);TAB(x%,y%);
1110 =""
1120 :
1130 DEF PROCerr(e$,x%,y%)
1140 VDU 7
1150 PRINT FNclr(x%,y%);e$;
1160 TIME=0
1170 REPEAT UNTIL TIME>250
1180 PRINT FNclr(x%,y%);
1190 ENDPROC
1200 :
1210 DEF FNinput(p$,l%,x%,y%)
1220 LOCAL i$
1230 PRINT FNclr(x%,y%);p$;
1240 INPUT ""i$
1250 IF i$="" THEN PROCerr(CHR$(133)+"P
lease type something in.",x%,y%):GOTO 12
30
1260 IF LEN(i$)>l% THEN PROCerr(CHR$(13
3)+"Maximum length of "+STR$(l%)+" chara
cters",x%,y%):GOTO 1230
1270 =i$
1280 :
1290 DEF FNcheck(n$,s$)
1300 LOCAL chk,i%,id$
1310 id$=""
1320 chk=OPENIN(n$)
1330 FOR i%=1 TO LEN(s$)
1340 id$=id$+CHR$(BGET #chk)
1350 NEXT
1360 =(s$=id$)
```

Continued ▶

◀ **Music listing 1 continued**

```
1370 :
1380 DEF PROCloadenvelopes
1390 IF envel$="def" THEN PROCdefaulten
velopes:ENDPROC
1400 file=OPENIN(envel$)
1410 FOR e%=1 TO 15
1420 FOR p%=1 TO 13
1430 env%(e%,p%)=BGET #file
1440 NEXT
1450 FOR d%=1 TO 3
1460 q=BGET #file
1470 NEXT
1480 NEXT
1490 CLOSE #file
1500 ENDPROC
1510 :
1520 DEF PROCdefaultenvelopes
1530 RESTORE 1630
1540 FOR e%=1 TO 15
1550 FOR p%=1 TO 13
1560 READ ep%
1570 env%(e%,p%)=ep%
1580 NEXT
1590 NEXT
1600 ENDPROC
1610 :
1620 REM Default envelope data
1630 DATA 3,0,0,0,0,0,0,127,255,0,255,1
26,77
1640 DATA 2,0,0,0,0,0,0,127,254,0,255,1
26,77
1650 DATA 1,0,0,0,0,0,0,127,255,0,255,1
26,0
1660 DATA 4,0,0,0,0,0,0,127,247,0,237,1
26,0
1670 DATA 4,0,0,0,0,0,0,127,241,0,241,1
26,0
1680 DATA 4,1,255,1,1,2,1,127,255,0,255
,126,0
1690 DATA 2,1,255,1,1,2,1,127,255,0,255
,126,0
1700 DATA 1,1,255,1,1,2,1,127,255,0,255
,126,0
1710 DATA 131,255,2,255,1,1,1,127,251,0
,251,126,55
1720 DATA 5,255,1,1,1,2,0,127,236,0,236
,126,0
1730 DATA 1,1,255,1,1,2,1,6,241,0,241,1
26,0
1740 DATA 1,0,49,0,9,1,3,63,255,0,255,1
26,0
1750 DATA 1,0,49,0,2,1,2,63,255,0,255,1
26,0
1760 DATA 5,0,4,0,2,12,0,127,255,0,255,
126,0
1770 DATA 129,0,5,0,9,30,0,127,255,0,25
5,126,0
1780 :
1790 DEF PROCinitialise
1800 music=OPENUP(source$)
1810 PTR #music=270
1820 keysig%=BGET #music
1830 tempo%=BGET #music
1840 PTR #music=PTR #music+2
1850 FOR voice%=1 TO 4
1860 v1%=BGET #music
1870 v2%=BGET #music
1880 notes%(voice%)=v1%+256*v2%
1890 NEXT
1900 ptr%(1)=282
1910 FOR voice%=1 TO 2
1920 ptr%(voice%+1)=ptr%(voice%)+3*note
s%(voice%)
1930 NEXT
1940 address%=autumn%+6
1950 ENDPROC
1960 :
1970 DEF PROCkeysignature
1980 RESTORE 2290
1990 FOR i%=1 TO 29
2000 keysig%(i%)=0
2010 NEXT
2020 FOR k%=0 TO (keysig% AND 127)
2030 READ major$,minor$,acc%
2040 IF acc%=0 THEN 2140
2050 FOR l%=1 TO ABS(acc%)
2060 READ sf%
2070 IF k%<>(keysig% AND 127) THEN 2130
2080 FOR o%=0 TO 4
2090 n%=sf%+o%*7
2100 IF n%>29 THEN 2120
2110 keysig%(n%)=SGN(acc%)
2120 NEXT
2130 NEXT
2140 NEXT
2150 IF (keysig% AND 128)=128 THEN keys
ig$=minor$+" minor" ELSE keysig$=major$+
" major"
2160 t$="STTTSTT"
2170 t%=20
2180 FOR p%=0 TO 28
2190 t%=t%+4-4*(MID$(t$,(p% MOD 7)+1,1)
="T")
2200 pitch%(p%+1)=t%
2210 NEXT
2220 RESTORE 2460
2230 FOR d%=1 TO 16
2240 READ duration%(d%)
2250 NEXT
2260 ENDPROC
2270 :
2280 REM Key signature data
2290 DATA C,A,0
2300 DATA G,E,1,1
2310 DATA D,B,2,1,5
2320 DATA A,F#,3,1,5,2
2330 DATA E,C#,4,1,5,2,6
2340 DATA B,G#,5,1,5,2,6,3
2350 DATA F#,D#,6,1,5,2,6,3,7
2360 DATA C#,A#,7,1,5,2,6,3,7,4
2370 DATA F,D,-1,4
2380 DATA Bb,G,-2,4,7
2390 DATA Eb,C,-3,4,7,3
2400 DATA Ab,F,-4,4,7,3,6
2410 DATA Db,Bb,-5,4,7,3,6,2
2420 DATA Gb,Eb,-6,4,7,3,6,2,5
2430 DATA Cb,Ab,-7,4,7,3,6,2,5,1
2440 :
2450 REM Note duration data
2460 DATA 1,2,3,4,6,8,12,16,24,32,48
2470 DATA 129,130,132,136,144
2480 :
2490 DEF PROCinfo
2500 CLS
2510 PROCdouble("Convert TMS to AUTUMN"
,-1,2,6,0)
2520 PRINT TAB(1,6);CHR$(133);"TMS Musi
c file:";CHR$(130);source$
2530 PRINT TAB(1,8);CHR$(133);"Key sign
ature:";CHR$(130);keysig$
2540 PRINT TAB(1,10);CHR$(133);"Note to
tals:"
2550 FOR v%=1 TO 3
2560 PRINT TAB(14,v%+9);CHR$(129)+"Voic
e ";v%;":";CHR$(130);notes%(v%)
2570 NEXT
```

Continued ▶

◄ Music listing 1 continued

```
2580 IF notes%(4)>0 THEN PRINT TAB(13,1
3);CHR$(136);CHR$(129);"Cannot convert v
oice 4"
2590 PRINT TAB(1,15);CHR$(131);"Convert
ing file..."
2600 PROCdouble(CHR$(136)+"Please wait.
",23,16,7,0)
2610 ENDPROC
2620 :
2630 DEF PROCtmstoautumn(voice%)
2640 IF notes%(voice%)=0 THEN GOTO 2810
2650 PROCresetbar
2660 PRINT TAB(20,19);CHR$(129);"Voice
";voice%
2670 curenv%=-1
2680 curvol%=-1
2690 repeat%=ptr%(voice%)
2700 repno%=-1
2710 ftbar%=-1
2720 stbar%=-1
2730 PTR #music=ptr%(voice%)
2740 note%=1
2750 REPEAT
2760 PRINT TAB(30,19);CHR$(130);"Note "
;note%;"   "
2770 PROCgetnote
2780 PROCanalyse
2790 note%=(PTR #music-ptr%(voice%))/3+
1
2800 UNTIL note%>notes%(voice%)
2810 PROCstore(255)
2820 ENDPROC
2830 :
2840 DEF PROCresetbar
2850 FOR i%=1 TO 29
2860 bar%(i%)=999
2870 NEXT
2880 ENDPROC
2890 :
2900 DEF PROCgetnote
2910 byte1%=BGET #music
2920 byte2%=BGET #music
2930 byte3%=BGET #music
2940 symb%=FNbarsymbol(byte1%)
2950 durat%=FNduration(byte1%)
2960 acc%=FNaccidental(byte2%)
2970 pitch%=FNpitch(byte2%)
2980 vol%=FNvolume(byte3%)
2990 env%=FNenvelope(byte3%)
3000 ENDPROC
3010 :
3020 DEF FNbarsymbol(b%)
3030 =(b% AND 7)
3040 :
3050 DEF FNduration(b%)
3060 =((b% AND 120) DIV 8)+1
3070 :
3080 DEF FNaccidental(b%)
3090 =(b% AND 7)
3100 :
3110 DEF FNpitch(b%)
3120 =(b% DIV 8)+1
3130 :
3140 DEF FNvolume(b%)
3150 =(b% AND 15)
3160 :
3170 DEF FNenvelope(b%)
3180 =(b% DIV 16)
3190 :
3200 DEF PROCanalyse
3210 IF vol%=0 THEN PROCrest(durat%):GO
TO 3260
3220 IF env%<>curenv% THEN PROCnewenvel
ope(env%):GOTO 3240
3230 IF vol%<>curvol% THEN PROCnewenvel
ope(env%)
3240 curenv%=env%:curvol%=vol%
3250 PROCnote(pitch%,acc%,durat%)
3260 IF symb%=1 THEN PROCresetbar
3270 IF symb%=2 THEN PROCopenrepeat
3280 IF symb%=3 THEN PROCcloserepeat
3290 IF symb%=4 THEN PROCftbar
3300 IF symb%=5 THEN PROCstbar
3310 IF symb%=7 THEN PROCresetbar
3320 ENDPROC
3330 :
3340 DEF PROCrest(d%)
3350 PROCstore(0)
3360 PROCstore(duration%(d%))
3370 ENDPROC
3380 :
3390 DEF PROCnewenvelope(e%)
3400 PROCstore(254)
3410 FOR p%=1 TO 11
3420 PROCstore(env%(e%,p%))
3430 NEXT
3440 PROCstore(env%(e%,12)*vol%/15)
3450 PROCstore(env%(e%,13)*vol%/15)
3460 ENDPROC
3470 :
3480 DEF PROCnote(p%,a%,d%)
3490 IF a%>0 THEN PROCsetacc(a%,p%)
3500 pi%=pitch%(p%)
3510 IF bar%(p%)<>999 THEN pi%=pi%+4*(b
ar%(p%)):GOTO 3530
3520 pi%=pi%+4*(keysig%(p%))
3530 PROCstore(pi%)
3540 PROCstore(duration%(d%))
3550 ENDPROC
3560 :
3570 DEF PROCsetacc(a%,p%)
3580 pa%=(a% DIV 2)
3590 IF (a% MOD 2)=1 THEN pa%=-pa%
3600 FOR o%=0 TO 4
3610 sf%=(((p%-1) MOD 7)+1)+7*o%
3620 IF sf%>29 THEN 3640
3630 bar%(sf%)=pa%
3640 NEXT
3650 ENDPROC
3660 :
3670 DEF PROCopenrepeat
3680 repeat%=PTR #music
3690 repno%=-1
3700 ftbar%=-1
3710 stbar%=-1
3720 PROCresetbar
3730 ENDPROC
3740 :
3750 DEF PROCcloserepeat
3760 IF repno%=-1 THEN repno%=0:PTR #mu
sic=repeat%:ENDPROC
3770 PROCopenrepeat
3780 ENDPROC
3790 :
3800 DEF PROCftbar
3810 IF ftbar%=-1 THEN ftbar%=0:ENDPROC
3820 IF stbar%=-1 THEN ENDPROC
3830 PTR #music=stbar%
3840 PROCopenrepeat
3850 ENDPROC
3860 :
3870 DEF PROCstbar
3880 stbar%=PTR #music
3890 PTR #music=repeat%
3900 PROCresetbar
3910 ENDPROC
3920 :
```

Continued ►

◄ **Music listing 1 continued**

```
3930 DEF PROCstore(st%)
3940 ?address%=st%
3950 address%=address%+1
3960 IF address%>himem% THEN PROCtoolon
g:RUN
3970 ENDPROC
3980 :
3990 DEF PROCtoolong
4000 FOR y%=15 TO 19
4010 PRINT FNclr(0,y%);
4020 NEXT
4030 VDU 7
4040 PROCdouble(CHR$(136)+"MUSIC FILE T
OO LONG! ",-1,16,7,1)
4050 *FX21 0
4060 CLOSE #0
4070 PRINT TAB(8,19);CHR$(133);"Press a
ny key for menu";
4080 IF GET
4090 ENDPROC
4100 :
4110 DEF PROCplaytune
4120 CLS
4130 PROCdouble("Convert TMS to AUTUMN"
,-1,2,6,0)
4140 PRINT TAB(1,6);CHR$(131);"Do you w
ant to hear the tune? ";
4150 REPEAT
4160 yn$=GET$
4170 IF yn$>="a" AND yn$<="z" THEN yn$=
CHR$(ASC(yn$)-32)
4180 UNTIL yn$="Y" OR yn$="N"
4190 IF yn$="N" THEN PRINT ;"No":GOTO 4
220
4200 PRINT ;"Yes"
4210 PROCplay(autumn%)
4220 ENDPROC
4230 :
4240 DEF PROCplay(addr%)
4250 tem%=VAL(FNinput(CHR$(130)+"Please
 enter the tempo: ",2,1,8))
4260 IF tem%<1 OR tem%>15 THEN PROCerr(
CHR$(133)+"Illegal tempo - 1 to 15 only"
,1,8):GOTO 4250
4270 FOR v%=0 TO 2
4280 p%(v%+1)=addr%+?(addr%+v%*2)+256*?
(addr%+v%*2+1)
4290 d%(v%+1)=FALSE
4300 NEXT
4310 REPEAT
4320 FOR v%=1 TO 3
4330 IF ADVAL(-5-v%)>0 THEN PROCsound(v
%)
4340 NEXT
4350 UNTIL d%(1) AND d%(2) AND d%(3)
4360 ENDPROC
4370 :
4380 DEF PROCsound(v%)
4390 IF d%(v%) THEN ENDPROC
4400 p%=?p%(v%):d%=?(p%(v%)+1)
4410 IF p%=254 THEN PROCenv:ENDPROC
4420 IF p%=255 THEN d%(v%)=TRUE:ENDPROC
4430 IF p%=0 THEN V%=0 ELSE V%=v%
4440 IF d%>128 THEN d%=d%-128:t=2/3 ELS
E t=1
4450 SOUND v%,V%,p%,d%*tem%*t
4460 p%(v%)=p%(v%)+2
4470 ENDPROC
4480 :
4490 DEF PROCenv
4500 IF ADVAL(-5-v%)<>15 THEN ENDPROC
4510 ?envel%=v%
4520 FOR i%=1 TO 13
4530 i%?envel%=?(p%(v%)+i%)
4540 NEXT
4550 X%=envel%
4560 Y%=envel% DIV 256
4570 A%=8
4580 CALL &FFF1
4590 p%(v%)=p%(v%)+14
4600 ENDPROC
4610 :
4620 DEF PROCsavetune
4630 PRINT TAB(1,10);CHR$(129);"Do you
want to save the tune? ";
4640 REPEAT
4650 yn$=GET$
4660 IF yn$>="a" AND yn$<="z" THEN yn$=
CHR$(ASC(yn$)-32)
4670 UNTIL yn$="Y" OR yn$="N"
4680 IF yn$="N" THEN PRINT ;"No":GOTO 4
710
4690 PRINT ;"Yes"
4700 PROCoscli("SA. "+object$+" "+STR$~
(autumn%)+" "+STR$~(address%))
4710 ENDPROC
4720 :
4730 DEF PROCoscli(o$)
4740 $&900=o$
4750 X%=0
4760 Y%=9
4770 CALL &FFF7
4780 ENDPROC
4790 :
4800 DEF PROCenvelopes
4810 CLS
4820 PROCdouble("Extract envelopes from
 TMS file",-1,2,6,0)
4830 source$=FNinput(CHR$(134)+"Source
file: "+CHR$(129)+"m.",7,1,6)
4840 source$="m."+source$
4850 temp=OPENIN(source$)
4860 CLOSE #temp
4870 IF temp=0 THEN PROCerr(CHR$(133)+"
Music file '"+source$+"' not found",1,6)
:GOTO 4830
4880 IF FNcheck(source$,"IamMusic")=FAL
SE THEN PROCerr(CHR$(133)+"'"+source$+"'
 is not a TMS Music File",1,6):GOTO 4830
4890 object$=FNinput(CHR$(134)+"Object
file: "+CHR$(129)+"e.",7,1,9)
4900 object$="e."+object$
4910 temp=OPENIN(object$)
4920 CLOSE #temp
4930 IF temp<>0 THEN PROCerr(CHR$(133)+
"Filename '"+object$+"' already exists",
1,9):GOTO 4890
4940 PROCextractenvs
4950 ENDPROC
4960 :
4970 DEF PROCextractenvs
4980 mem%=autumn%
4990 s=OPENUP(source$)
5000 PTR #s=15
5010 FOR b%=0 TO 254
5020 q%=BGET #s
5030 ?(mem%+b%)=q%
5040 NEXT
5050 CLOSE #s
5060 o=OPENOUT(object$)
5070 id$="IamEnvel"
5080 FOR b%=1 TO 8
5090 BPUT #o,ASC(MID$(id$,b%,1))
5100 NEXT
5110 FOR b%=254 TO 0 STEP -1
5120 BPUT #o,?(mem%+b%)
```

Continued ►

◀ Music listing 1 continued

```
5130 NEXT
5140 FOR b%=0 TO 14
5150 BPUT #o,100
5160 NEXT
5170 FOR b%=0 TO 14
5180 BPUT #o,10
5190 NEXT
5200 CLOSE #o
5210 ENDPROC
5220 :
5230 DEF PROCruntms
5240 CLS
5250 PROCdouble("Run The Music System",
-1,2,6,0)
5260 PRINT TAB(1,6);CHR$(130);"Insert t
he";CHR$(133);"System";CHR$(130);"disc..
."
5270 PRINT TAB(12,8);CHR$(129);"Press a
ny key when ready."
5280 *FX 21 0
5290 IF GET
5300 PROCoscli("RUN !boot")
5310 ENDPROC
5320 :
5330 CLOSE #0
5340 IF ERR=17 THEN RUN
5350 MODE 7
5360 REPORT
5370 PRINT ;" at line ";ERL
5380 END
```

Listing 2. File player

```
10 REM Music file player
20 REM by Richard Sheard
30 REM for B/B+
40 REM (c) Acorn User July 1988
50 :
60 *TV 255
70 MODE 7
80 HIMEM=HIMEM-&2000
90 S%=HIMEM
100 DIM p%(3),d%(3),env% 14
110 :
120 INPUT "Filename: "name$
130 PROCoscli("LO."+name$+" "+STR$~HIM
EM)
140 REPEAT
150 INPUT "Tempo: "tempo
160 UNTIL tempo>0
170 FOR I%=0 TO 2
180 p%(I%+1)=S%+?(S%+I%*2)+256*?(S%+I%
*2+1)
190 d%(I%+1)=FALSE
200 NEXT
210 REPEAT
220 FOR I%=1 TO 3
230 IF ADVAL(-5-I%)>0 PROCsound
240 NEXT
250 UNTIL d%(1) AND d%(2) AND d%(3)
260 END
270 :
280 DEF PROCsound
290 IF d%(I%) ENDPROC
300 p%=?p%(I%)
310 d%=?(p%(I%)+1)
320 IF p%=254 PROCenv:ENDPROC
330 IF p%=255 d%(I%)=TRUE:ENDPROC
340 IF p%=0 V%=0 ELSE V%=I%
350 IF d%>128 d%=d%-128:t=2/3 ELSE t=1
360 SOUND I%,V%,p%,d%*tempo*t
370 p%(I%)=p%(I%)+2
380 ENDPROC
390 :
400 DEF PROCenv
410 IF ADVAL(-5-I%)<>15 ENDPROC
420 ?env%=I%
430 FOR J%=1 TO 13
440 J%?env%=?(p%(I%)+J%)
450 NEXT
460 X%=env%
470 Y%=env% DIV 256
480 A%=8
490 CALL &FFF1
500 p%(I%)=p%(I%)+14
510 ENDPROC
520 :
530 DEF PROCoscli(string$)
540 DIM X% &FF
550 Y%=X% DIV 256
560 $X%=string$
570 CALL &FFF7
580 ENDPROC
```

MANDELBROT SPEEDS

Faster, Faster

Following our Mandelbrot feature in the March 1988 issue of Acorn User, *we had several alternative programs submitted. The fastest of these was sent in by Stephen Streater and managed a time of 3 seconds. Stephen's programs were included on the May 3.5 inch disc as a special bonus for Archimedes users. This can still be obtained from* Acorn User *by sending a cheque for £7.95 to Redwood Publishing, 20-26 Brunswick Place, London, N1 6DJ.*

There is an Archimedes bonus, in the form of a graphics screen or useful utility, on every 3.5 inch disc.

Computer	Language	Time for 65,000 pixels
BBC model B	Basic	8.5 hours
BBC Master Turbo	Basic	3 hours
IBM PC	Turbo Pascal	1.5 hours
Atari ST	68000 assembler	4 minutes
32 BBCs processing in parallel on an Econet system	6502 assembler	3 minutes
MicroVax	C	2.5 minutes
Single Archimedes without co-processor (AF)	ARM assembler	28 seconds
Single Archimedes without co-processor (SS)	ARM assembler	3 seconds

TOP OF THE LIST

Label finder

*This short routine searches through the source code of machine code program and lists the names of the labels in alphabetical order. Type in the program, save it and then run it. A checksum is included to help eliminate errors. The utility assembles at &900, although this could easily be changed. Once saved, the code can be called either by '*Labels' or, if already loaded, by 'CALL &900'. The program will find labels only if they are at the very start of lines with no preceding spaces.*

Beware: Do not interrupt the program in any way when it is running (eg Break) as your source code will become corrupted!

The program works by looking through your source code a byte at a time until it finds a line that starts with a '.'. It then takes the text that follows the dot and compares it to the 'smallest' (ie, lowest ASCII valued) label found so far (at the start it is compared to ~; since this has ASCII code 126, all labels must be less than this). If the new label is smaller, then it is stored. This process is continued until the end of program marker is found.

At this point, the stored label name is printed and its 'dot' in your source code is replaced by ASCII 255. The program then starts from the top again and works through until no new labels are found. A final loop goes through your source code once more and restores all original 'dots'. This is why it is vital not to stop the program: if you do your source will be full of 255s instead of '.'s!

*Why not amaze your friends and install *Labels in Autorom!*

Listing 1. Source code label list

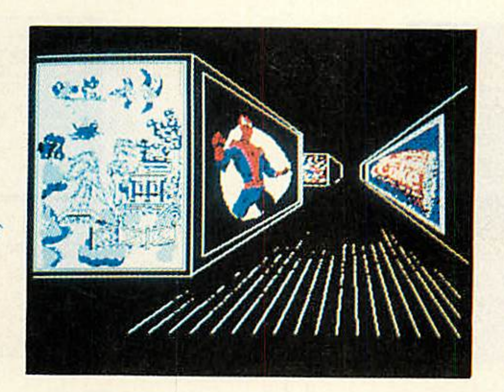
```
   10 REM Label finder
   20 REM By David Lawre
nce
   30 REM For BBC B/B+/M
/C/E
   40 REM (C) Acorn User
 July 1988
   50 :
   60 PROCcode
   70 PROCcheck
   80 PROCsave
   90 END
  100 :
  110 DEF PROCcode
  111 DIM cli 40
  120 point=&70:lowest=&
72
  130 page=&18:cr=13
  140 osasci=&FFE3
  150 :
  160 FOR pass%=0 TO 2 S
TEP 2
  170 P%=&900
  180 [OPT pass%
  190 .main
  200 LDA page
  210 STA point+1
  220 LDA #0
  230 STA point
  240 LDA #ASC"~"
  250 STA label
  260 LDA #cr
  270 STA label+1
  280 .loop
  290 LDY #0
  300 LDA (point),Y
  310 CMP #cr
  320 BNE continue
  330 INY
  340 LDA (point),Y
  350 CMP #&FF
  360 BEQ nomore
  370 LDY #4
  380 LDA (point),Y
  390 CMP #ASC"."
  400 BNE continue
  410 LDX #&FF
  420 .compare
  430 INY
  440 INX
  450 LDA (point),Y
  460 CMP label,X
  470 BCC islower
  480 BEQ compare
  490 BNE continue
  500 .islower
  510 LDY #4
  520 .copy
  530 INY
  540 LDA (point),Y
  550 STA label-5,Y
  560 CMP #cr
  570 BEQ copied
  580 CMP #ASC" "
  590 BNE copy
  600 LDA #cr
  610 STA label-5,Y
  620 .copied
  630 LDA point
  640 STA lowest
  650 LDA point+1
  660 STA lowest+1
  670 .continue
  680 INC point
  690 BNE loop
  700 INC point+1
  710 BNE loop
  720 .nomore
  730 LDY #4
  740 LDA #0
  750 STA (lowest),Y
  760 LDA label
  770 CMP #ASC"~"
  780 BEQ restore
  790 LDY #&FF
  800 .print
  810 INY
  820 LDA label,Y
  830 JSR osasci
  840 CMP #cr
  850 BNE print
  860 BEQ main
  870 .restore
  880 LDA page
  890 STA point+1
  900 LDA #0
  910 STA point
  920 .resloop
  930 LDY #0
  940 LDA (point),Y
  950 CMP #cr
  960 BNE nextone
  970 INY
  980 LDA (point),Y
  990 CMP #&FF
 1000 BEQ exit
 1010 LDY #4
 1020 LDA (point),Y
 1030 BNE nextone
 1040 LDA #ASC"."
 1050 STA (point),Y
 1060 .nextone
 1070 INC point
 1080 BNE resloop
 1090 INC point+1
 1100 BNE resloop
 1110 .exit
 1120 RTS
 1130 .label
 1140 ]
 1141 NEXT pass%
 1150 ENDPROC
 1160 :
 1170 DEF PROCcheck
 1180 T%=0
 1190 FOR I%=&900 TO P%-
1
 1200 T%=T%+?I%
 1210 NEXT
 1220 IF T%=22390 ENDPRO
C
 1230 PRINT"Checksum err
or"
 1240 END
 1250 :
 1260 DEF PROCsave
 1270 $cli="Save Labels
900 "+STR$~P%
 1280 X%=cli MOD 256
 1290 Y%=cli DIV 256
 1300 CALL &FFF7
 1310 ENDPROC
```

OFFERS

THIS MONTH'S LISTINGS

This month, Joe offers special help with spreadsheets. Owners of a Master or Master Compact can now start using spreadsheets without fear.

Musicians will enjoy using the music conversion routine. This program will enable you to convert files from Island Logic's *Music System* to the *Autumn* standard. We have also included the *Autumn* *Play routine first published in April 1987.



July's Hints and Tips shows how you can copy 40-track discs to 80-track and explains away any problems you experience with 40/80 track switchable disc drives. There is also an ingenious routine to speed up cassette loading.

The Graphics Bonus this month is Gallery, a stroll around an art gallery of past graphics masterpieces.

The July listings come on 5.25-inch disc for £5.95 and cassette for £3.95.

Spreadsheet help and more music – the easy way

DISC SUBSCRIPTIONS

Guarantee the priority delivery of your monthly listings by subscribing. Each month our discs contain the very best quality graphics, utilities and routines.

A subscription to the monthly discs will save you hours of typing and de-bugging, leaving you time to enjoy the programs.

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Save pounds by subscribing

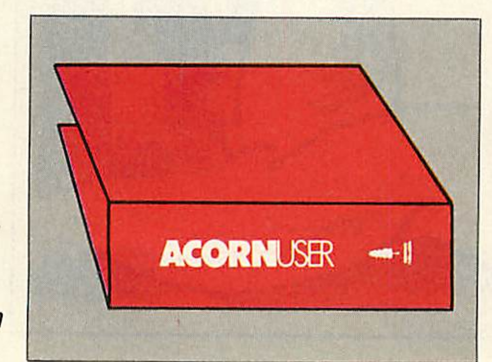


MAGAZINE BINDERS

Keep your *Acorn User* magazine collection in style with our smart red binder; no more misplaced or dog-eared copies. The binder features a wide spine to hold 12 issues of 200 pages.

£4.95 ensures that your valued guide to the BBC, Electron and Archimedes will always be kept in pristine condition.

Have you missed any issues of *Acorn User* magazine, discs or cassettes? *Acorn User* has been publishing the essential guide to Acorn computing for five years. Think what you might have missed! Take this opportunity to make up your collection. Remember that all pre-1987 discs and cassettes are still at the sale price of £3.95 and £2.95. Most issues are still available but stocks are getting very low. For a complete list of back issue contents write to: Seran Haddick, Redwood Publishing Ltd, 20-26 Brunswick Place, London N1 6DJ.



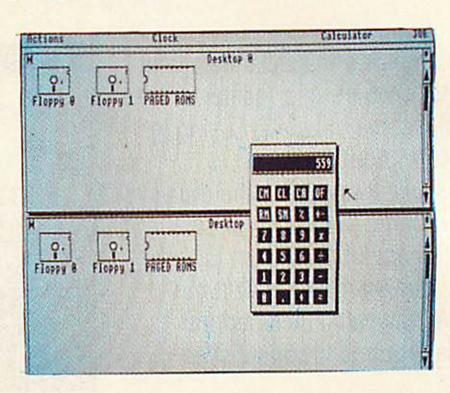
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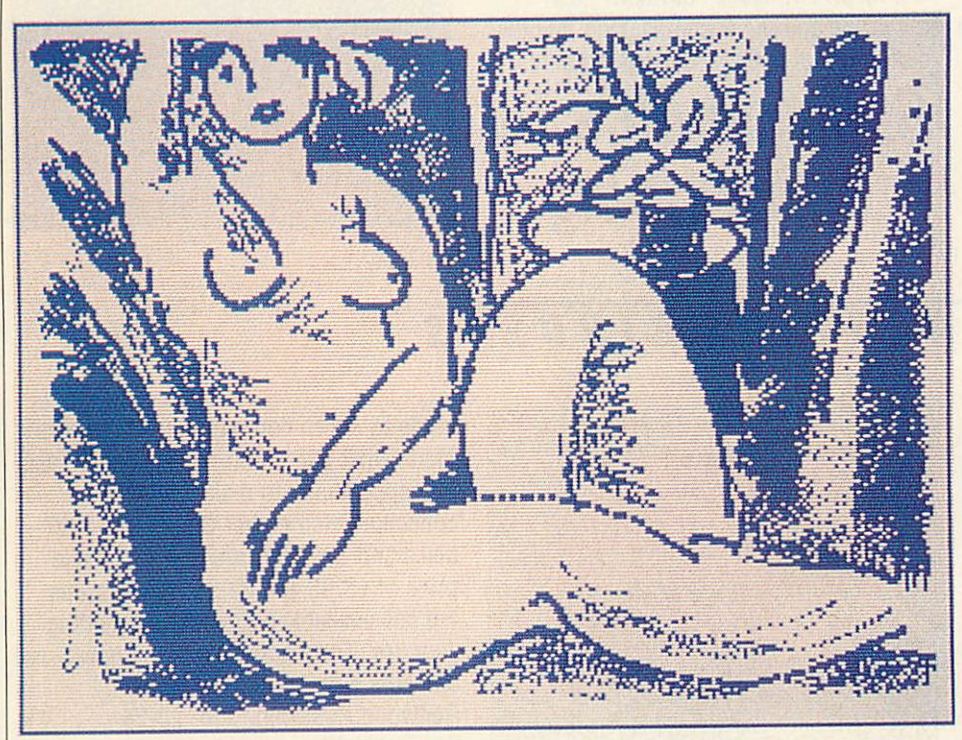


Great graphics utilities

The 40-track 5.25-inch *Graphics Utilities* disc, keenly priced at £7.95, features 16 stand-alone machine code utilities, an advanced teletext editor, several useful Basic procedures, an easy-to-adapt disc header and index. Included are: *ROTATE, rotates area through 180 degrees; *SWAPCOL, swaps two colours; *COLFILL, a colour fill routine; *SVPIC, saves a compacted picture; *LDPIC, reloads a compacted picture. There are many utilities to manipulate graphics.

The best of '87 Compilation disc

All your favourite programs from 1987 on one disc, including Kiddie Art; Tapestry; PCB by CAD; music programs, Theme and Autumn; Joe Telford's GEM-like front-end for the Master; a proportional screen dump; a *View* printer driver generator and a routine for printing spreadsheets sideways. The second half of the disc is devoted to graphics, with a video image enhancer and six Graphics Bonuses. The 80T disc, with comprehensive manuals, is only £6.95.



Micro masterpieces on Portfolio for £9.95

Jonathan Inglis, freelance illustrator, has assembled a *Portfolio* of his best work exclusively for *Acorn User*.

The disc contains screens that have been used by national and regional publications. Included are Seurat's *Bathers*, a *Time Out* cover from August 1985, and two familiar *Acorn User* covers, Willow (Nov '86) and Magician (Jan '86), as well as several pictures commissioned by *The Times*.

Three of Jonathan's favourite masterpieces are on the disc; Seurat's *Riverside,* Vermeer's *Lady at the Virginal* and a copy of a famous lithograph by Matisse. Sade fans will probably be more interested in the two stunning portraits of the singer included on the disc.

You can create your own *pièce de résistance* using the Pixel Editor and Super Painter programs. Pixel Editor allows you to draw in and alter minute detail, while Super Painter enables you to draw lines, texture your screen and shade by mixing the eight standard colours.

Portfolio comes in 80-track 5.25-inch format with a comprehensive instruction sheet telling you about the pictures and how the artist created them. This disc can be yours for only £9.95.

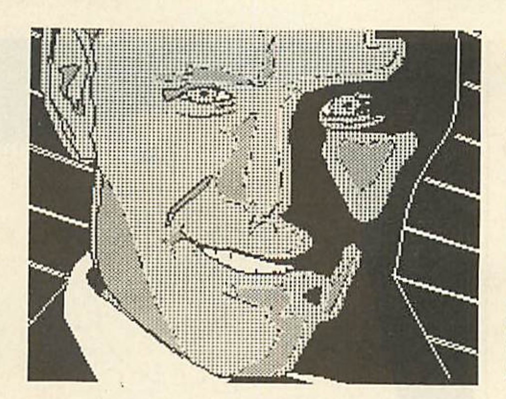
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OFFERS

USERDUMP ROM

BBC/B/B+/M/C The *UserDump* ROM will allow you to dump any screen image in any display mode by entering a single command – either as a line of your program or by typing it directly from the keyboard. A perfect dump can also be obtained while a machine code program is running.

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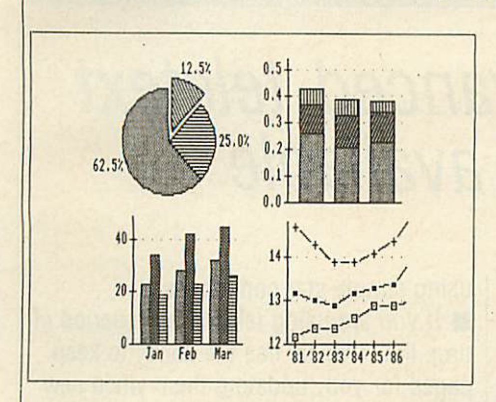
translate a teletext screen into mode 1, and shift any area of memory.

UserDump will work with any Epson-compatible printer which has single-density and double-density bit-image graphics including the Star Gemini, Delta, SG, SD and SR, Canon and Kaga NLQ.

Details of further commands and printer compatibility are available from Seran at Redwood Publishing Ltd, 20-26 Brunswick Place, London N1 6DJ.

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VIEWCHART DISC



ViewChart features a suite of programs which can be used to produce high-resolution graphics in pie chart, bar chart or line graph form. Data can be entered manually, or read from *ViewSheet*, *ViewStore* or *View* files.

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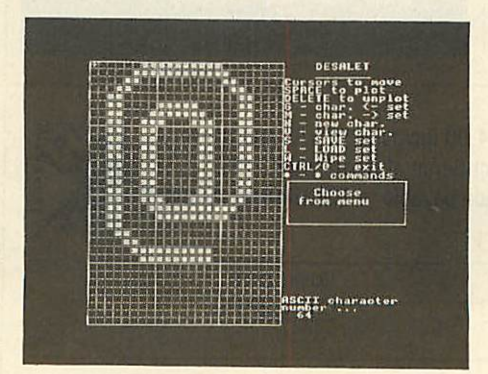
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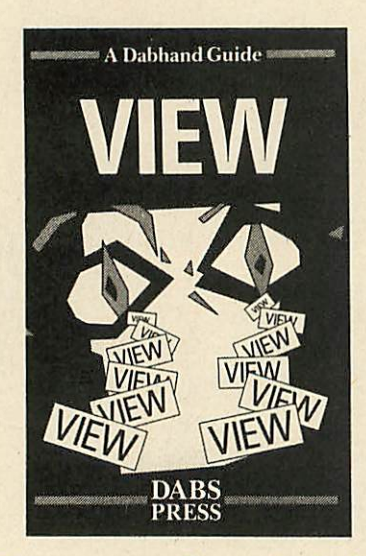
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REVIEWS

THE GAMES PAGE

RAMPANT REPTONS

Sam Greenhill dons green eye-shade and steps into the hot seat with his round-up of latest info for keyboard crashers, including the newest incarnation of an old-favourite

There's a lot happening on the games front, most of it from Superior, but Audiogenic, working on a game called *Shark*, a horizontally-scrolling shoot-em-up, plus two or three others still under wraps.

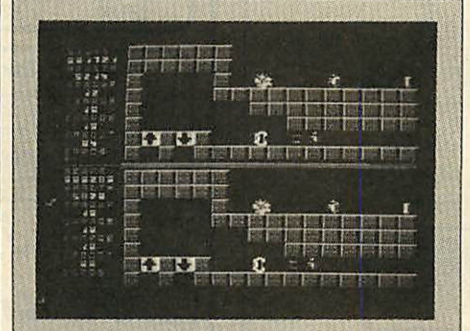
By the time you read this, Tynesoft should have brought out *Sygon*, its version of *Commando*. The theme is very much the same – you control a *Rambo*-style soldier and your task is to rescue captives from an infinitely large enemy army. According to Tynesoft's David Croft, the game is 'of greater quality' than *Commando*, so it should be worth getting your hands on a copy.

Also from Tynesoft is another sports simulation. This time, however, it's not set in the cold and is appropriately named *Summer Olympiad*. It's to be released at the same time as the Olympic games – does this mean we won't see any more Tynesoft Olympic simulations until the next games in 1992?

The *Repton* era continues, with the lovable green lizard and his trusty time machine in yet another set of screens for 'Repton 3', called *Repton Thru Time* – will there be no end? In his latest escapade, Repton meets dinosaurs in prehistoric caves, is chased around pyramids in ancient Egypt by mummies, and collects gold coins amid the smog and grime of Victorian times back at home.

Then it's on to the present where Repton experiences city life, collecting cola cans and avoiding traffic wardens. Of course, to round off any time traveller's day, it must be forward to the future. Here, you-know-who is pursued by little green Martians in his quest for crystals, while evading black holes and other various unpleasant devices.

To promote the new game, Superior is selling Repton cuddly toys. Presently available are the old but not forgotten blue, yellow and green design; and Arctic Repton and a teenage model. Egyptian Reptons are being offered as prizes but *Repton* fans should watch out for next month's *Acorn User* competition, where Repton cuddly toys will be among the prizes that are up for grabs.



A new software house was launched recently. Mandarin Software won't be writing its own games but marketing those of other companies. Famous names like Level 9 are involved and a new version of *Time* and *Magik* will be out soon for the Master. First release for the Beeb was two-player fast-action game *Icarus* (above), written by the Powerhouse team who were responsible for *Dunjunz*.

Superior has a number of games in the pipeline, the first, to be released sometime in July, is called . . . *Pipeline*. You are Red O'Dare, a small chap who has to crawl along the pipes of an oil refinery putting out fires. This is just another snakes and ladders game, but knowing Superior it ought to have something unique to make it a cut above the average.

After *Pipeline*, comes a game similar to *Codename Droid*, called *Exile*, set for release by August. This was going to come out earlier but it has been delayed because of a novelette that will accompany it. The story goes that you are called to a planet by a distress call from a party being destroyed by the evil Triax – not a type of film for your camera, just someone who carries out experiments on unsuspecting human beings.

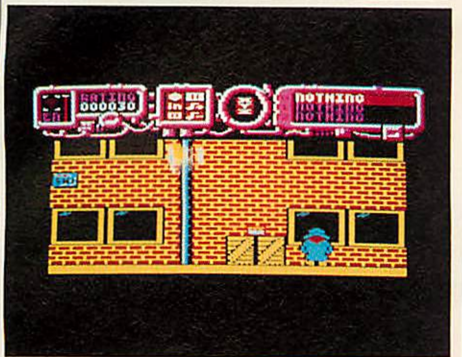
Archimedes owners who are eager to see the end of *Zarch*, can now do so. Having loaded the game and settled yourself comfortably on the launch pad, pressing Q, T and U simultaneously enters you into cheat mode. If this fails first time, press S to reinstate sound and try again. Once in cheat mode, there are three utilities that can aid matters considerably. You can toggle between manual and automatic pilot by pressing D, and refuel by pressing F – it's particularly useful if you hold down F when chasing a bomber, so that the bombs don't affect you. By pressing L you can grant yourself an extra life. Holding down L provides you with enough lives to get to wave 59, perhaps with a little help from the auto-pilot, where the game ends with a rather disconcerting finale.

The latest news from Robico, which produced *The Hunt*, is another graphic adventure, to be released soon. It has also just begun work on a sequel to *Village of the Lost Souls* but that won't be around for some time yet.

Minerva has taken a break from business software, and has almost finished two Arc games, both of which should be much better than *Minotaur*. One's called *Hoverbod* and sounds like a cross between *Quest* and *Starquake*, only with better graphics. The other game is a renewed golden oldie – *Mission Control*. Here you control three bases and six cities. The idea is to direct your missiles at the descending aliens.

That's all for now, but you'll be hearing from me next month as I have taken over The Games Page from arch keyboard crasher David Lawrence. If you have any games coming out, pokes, cheats or a high score, send them to me at The Games Page, Acorn User, Redwood Publishing Ltd, 20-26 Brunswick Place, London N1 6DJ.

CAT ON ICE



Spycat; Superior Software; BBC: £9.95, (tape) £11.95 (disc); Master Compact £14.95 (disc); Electron: £9.95 (tape)

There is nothing astoundingly new in Superior's latest offering, in which you must guide a Paddington Bear clone through 100 screens of fiendish puzzles and unusual adversaries. But don't let this put you off immediately, *Spycat* is a very amusing game. The hero, Peter Correct (pardon?), must find three top secret documents, microfilm them and then emigrate to Greenland to write up his escapades.

You can carry three items at a time and there are about 30 objects dotted about the game. Some are easy to find: there's a Z88, an oxygen cylinder and various passcards. Some, like the documents, are hidden in cupboards. Others must be bartered for. This takes place between you and the other people and machines in the game. You can meet M, Q and even the good ol' PM, Mrs Thatcher in Downing Street.! There's also a tea machine, though it seems to dispense only Underground tickets!

Your unusual adversaries include surveillance cameras, space-suited people and electrified floors. All of these drain your energy if you hit them. I found the collision detections a bit on the harsh side and, as the sprites are large, it's quite hard to miss them sometimes. However, the sprites move smoothly and the main character is quite well animated.

Screen layout is very good, the 'standard' format of a shrunk Mode 5 screen with a palette switch is used to great effect. The status bar is nicely drawn and very detailed while the main screen, although quite small, contains some very nice 3D shading effects. On the other hand, the icon system for selecting actions is rather fiddly. Actions like 'get', 'drop' 'enter' and 'use' should have been on keys. Some actions seem to change your selected item – very strange and annoying.

After about half an hour the best I got was a rating of 2330 and the custody of US Secrets! Overall, I found *Spycat* fun to play, despite a passing similarity to certain Audiogenic games.

David Lawrence

HEAVY METAL

Uridium; Hewson Consultants; BBC; £7.95 (tape)

I remember Hewson Consultants from a few years back with their *Nightflight* flight simulator, and it appears that they haven't been idle in the meantime. *Uridium* is a fast-action arcade shoot-em-up, and pretty impressive it is, too.

The action takes place above the surface of some large structure, possibly a large enemy spaceship, which scrolls horizontally against a background of fixed stars. The background scrolling is quite simply the smoothest I've ever seen on a BBC micro, and up to the standard of arcade machines.

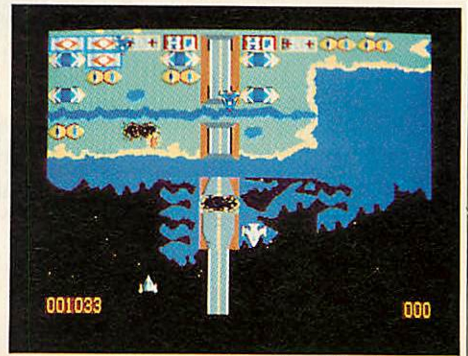
The enemy ships are also made more 'real' by using the two shades of blue and black to give an impression of shading; they, too, move very smoothly. Your task is to shoot down weaving and looping enemy ships, destroy ground installations and, finally, set down on a landing strip before moving onto the next wave.

Even though it took me a long time to load the game from cassette, I was left with a good impression – the graphics impressed me that much. The controls were a little awkward in their action; the positioning is user-definable but the forward/backward response was strangely weighted, though quite playable. Apart from that, the game is technically excellent.

The various stages of the game are associated with metals: Zinc, Lead, Copper and so on. Uridium is presumably the highest level, but I didn't get anywhere near that far into the game! I tired of it eventually, but given an arcade trackball I could have played for hours.

Ken Stewart

ARC-ADE ACTION



Quazer; Julain Rockey, Brecklands, Broad Oak, Shrewsbury, Shropshire; Archimedes; £8.95 (disc)

At last Archimedes owners have a game of mindless violence! *Quazer* is a souped up 'zap the aliens' game, along the lines of *Firetrack:* you fly your ship over a scrolling landscape, destroying as many of the ground installations as you can while dodging and shooting the alien onslaught.

You progress through the 11 levels by shooting a certain number of red diamonds on each level; if you don't shoot enough you lose a life, but if you do you're given the password to the next level.

There is a range of different aliens, some of them familiar looking mouse – pointers and floppy disc icons, for example. Some swoop down while others perform complex loops, and there is the occasional one that homes in on you. Of course the aliens don't just fly about, they also bombard you. To make life even more fun, it is possible to crash into bits of the scenery.

The scrolling is very even except during an explosion, when it hiccups slightly. None of the sprites are animated, but they all move very smoothly no matter how many are on the screen. The instructions scroll up the screen, Star-Wars style, accompanied by a pleasant tune.

The collision detection seems a bit one-sided and quite often bullets emerge from slightly to the right of the gun. The scrolling message on the title page also manages to take a piece of the border with it. The game gets too hard too quickly, but out of the small pool of Arc games, *Quazer* is definitely the best. Although not as graphically impressive as some, it is fun to play.

David Lawrence

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SOFTWARE

BEND IT, SHAPE IT

Rob Miller reviews a new font editor and effects ROM for Quest Paint

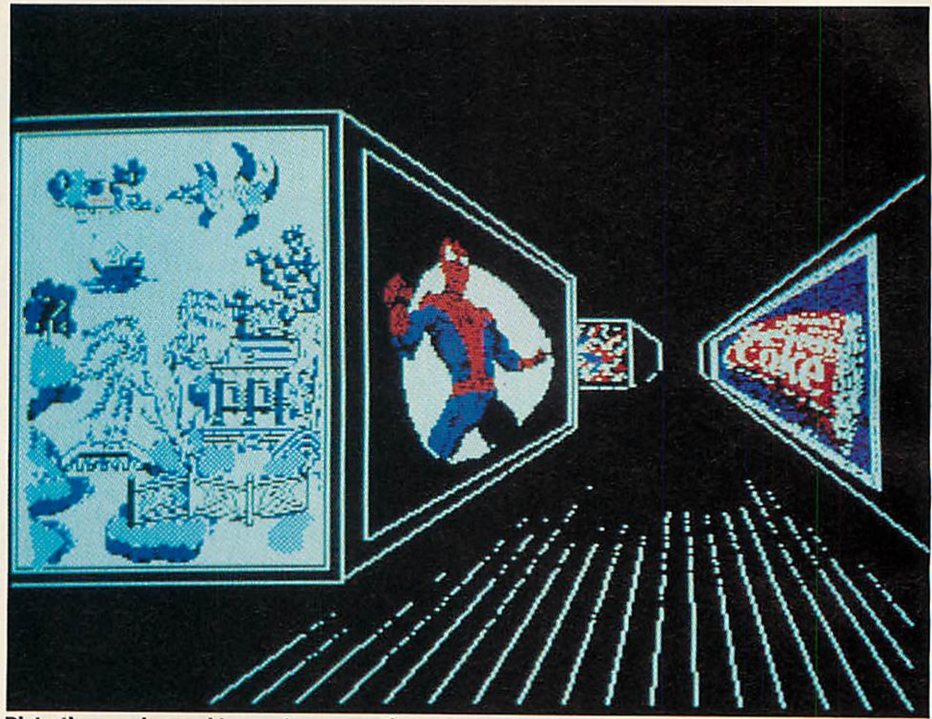
Last October, Watford Electronics brought out its *Quest Paint* art package for the BBC B and Master series. The list of features was impressive but still lacked some facilities that would have made it a complete package. The lack of a font designer and special effects such as Rotate and Distort have now been remedied with the arrival of *Conquest* from Watford.

The software comes in the form of a 32k PAL ROM, similar to the *Quest Paint* ROM. This means that Master owners will have to mount the ROM on a ROM cartridge if they don't want to sacrifice sideways RAM. Another complication is that normal (Acorn standard) cartridges will not fit in the Master if they have PAL ROMs fitted. The only cartridge that will fit is an elongated model from Care Electronics (see address at end of acticle).

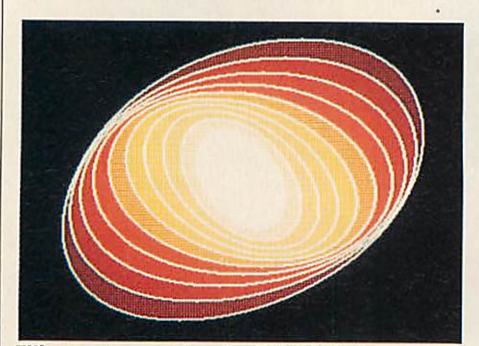
Once I had managed to fit the ROM, I switched on the machine and typed *HELP. The *Quest Paint* message appeared as usual, plus the info about the new *Conquest* ROM. All seemed to be working fine so after a flick through the manual I was ready to go.

Conquest consists of a list of new * commands plus some extensions and enhancements to the current facilities. The command *FONTEDIT gives access to the built-in font editor, and is actually treated as a separate language. By setting the LANG parameter in the Master's CMOS RAM to the position of the *Conquest* ROM, the computer will enter the Font Editor on power-up – not particularly useful but interesting. The rest of *Conquest* can only be accessed from within *Quest Paint*. This is where the prblems started.

Try as I might, I could find no way of using the new commands. Even after several in-depth looks at the manual, I was still stumped. Admitting defeat, I contacted the people at Watford, only to be told that *Conquest* will only work with the latest version of *Quest Paint*. Back went my *Quest Paint* ROM and in return came the 'latest' version, number 1.10. Anyone with an earlier copy has been warned!



Distortion can be used to create perspective



Ellipses, drawn using the GXR ROM

Conquest's menu is disarmingly simple

With the new ROM installed, I could begin. The * commands consist of several instructions to enable/disable sideways RAM, shadow RAM and the ROM itself. Another * command allows editing of the in-built printer dump.

Perhaps the most annoying thing when using a mouse on a computer is having to return to the keyboard to type text, filenames, etc. In the original *Quest Paint*, selection from various menus including load and save, could only be made using the keyboard. *Conquest* now allows files to be selected by positioning the cursor over the relevant name with the mouse. In addition, names can also be selected from the catalogue when saving files. You are then asked whether you wish to overwrite the file. This too can be controlled with the mouse: clicking the button after the filename will overwrite that file; click anywhere else on the screen and the save will be aborted, leaving the original in place.

The remaining extensions can be accessed by first calling up the I/O menu and then clicking with the mouse's middle button. The available facilities include resetting of patterns, brushes and fonts to

those supplied on the original *Quest Paint* utility disc. As well as the font editor, an extended picture creator and a ROM-based screen dump make a welcome appearance.

Pictures of up to 640 by 256 pixels can be created on disc or sideways RAM – eg, a picture roughly twice the size of a normal screen can be stored comfortably in a Master's sideways RAM.

The screen dump allows for quarter, half and full size screen dumps. Screens can be rotated through steps of 90 degrees. Negative or inverse screen dumps are also catered for. Although the dump has been written for fully Epson compatible printers, it can be modified using a combination of *SAVEPRINT and the printer driver customiser on the original *Quest Paint* utility disc.

The final commands are all graphics based and represented on screen by various icons. Most of them apply to rotation of solid/outlined ellipses, arcs, chords and segments. These in fact use the new graphics commands available on Acorn's GXR ROM and the Master OS, and are therefore unavailable unless you own either of the above.

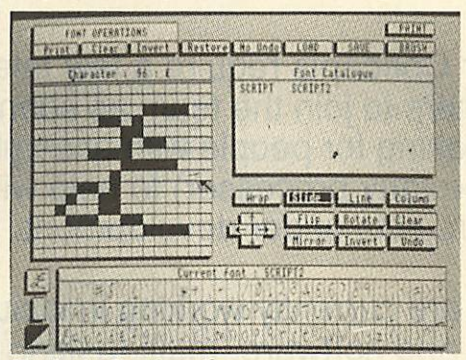
Two other commands, Rotate and Distort, do just what they say — rotate and distort selected areas of the screen. The area to be rotated or distorted must first be selected by using the cut option from the top menu (this isn't particularly clear in the manual). When the rotate option is used, a box the size of the cut-out appears at the current cursor position. The box is then rotated by moving the cursor left to right. If you get carried away spinning the cut-out clockwise and anti-clockwise, it can be difficult to remember which side is the top and which the bottom. It would have been a nice touch to have these in different colours, or perhaps the top indicated by a solid and the bottom by a dotted line.

The Distort function allows a selected area to be squashed or stretched into any four-sided shape, at any angle. Four clicks are required, to indicate the bottom left, top left, top right and bottom right corners of the cut-out. Even whole screens can be squashed into a few pixels. The maths to perform a distortion can be quite complex and so it normally takes some time to execute, and is as good a time as any to stop for a cup of coffee.

The font editor

This is really a separate program on its own, and is treated as such in the manual. The editor can be accessed from Basic (or any other language) by issuing a *FONTEDIT command. It can also be accessed directly from *Quest Paint*, although any picture being worked on at the time will be lost. For those prone to mistakes, there is a 'safety net' of having to double-click on the font edit icon.

Once in the font editor you are presented with various grids and menus on a mode 0 screen. The characters from 32 to 126 are displayed along the bottom in their presently defined forms. Clicking on a particular character will transfer it to the actual editing grid where a magnified version, 16 by 16, is displayed. Once selected, a character can be manipulated in various ways: shifted, flipped or mirrored in any of four directions, rotated, inverted (all black is turned to white and vice versa), or cleared to white. There is also a facility for expanding or shrinking characters horizontally, vertically or both. If the expand option is selected, the character is split at the current cursor position and a new row/column inserted.


The font editor in action



Creative effects with test

The final option on offer is the mask, which effectively allows you to clip a pre-defined section of any character. The manual suggests that this should be used when you wish to design a font where each character has a similar border. This seems to be of use, though, only if you wish to keep all characters to a similar size.

As well as fonts, the editor allows brush patterns to be loaded, edited and saved. A special icon is toggled on or off, causing the first x characters to be manipulated. (There is a brush editor in the original *Quest Paint*, although this doesn't have such things as the rotate or increase/decrease facilities.)

Designing new fonts can often take a long time and can become quite tedious. Watford has therefore taken the opportunity to provide compatibility with other systems such as *AMX Pagemaker* (now called *AMX Stop Press*). Fonts from *Pagemaker* can be loaded directly into the editor without the need for any prior conversion.

Quest vs the rest

There are two main alternatives to *QP/C*; *AMX Super Art* from AMS and *Microbrush* from AB Designs. All three programs are ROM based. *Microbrush*, at £150, has all the features of *QP/C*, but is particularly difficult to master. It is very much aimed at advanced users producing artwork for printing and high price make it suitable only for a) professionals or, b) people with money to burn.

The other alternative is *Super Art* at £49.99. It was the first 'real' art package for the BBC micro series and although very good for its price, it now looks rather dated.

Given the choice between *Super Art* and *QP/C*, I would still go for *QP/C*. Having used both extensively, I've found *QP/C* both easier and friendlier to use, and well worth the extra £20 or so it will cost you. **Rob Miller**

Conclusion

It would have been nice to see the ellipse and arc routines present in the *Conquest* ROM itself, thus allowing BBC B users access to the enhancements on offer. But apart from this, I could find no serious fault with *Conquest*. Added to *Quest Paint*, it really improves what is already an excellent graphics product.

As you can only use *Conquest* with *Quest Paint*, the complete package will cost just over £100 (which also includes a good-quality mouse). Even so, if you are looking for a professional art package that has the lot, you should look no further than *Quest Paint* plus *Conquest*.

Conquest, £33.35; Quest Paint + Mouse, £67.85. Both from Watford Electronics, Jessa House, 250 Lower High Street, Watford, Herts WD1 2AN. Tel. (0923) 37774. .

Care Master ROM Cartridge, £10.35 from Care Electronics, 800 St Albans Road, Garston, Watford, Herts WD2 6NL. Tel. (0923) 672102.

HARDWARE

TRANSFORMER

Dave Futcher investigates a hardware and software package that transforms a Model B into a Master 128

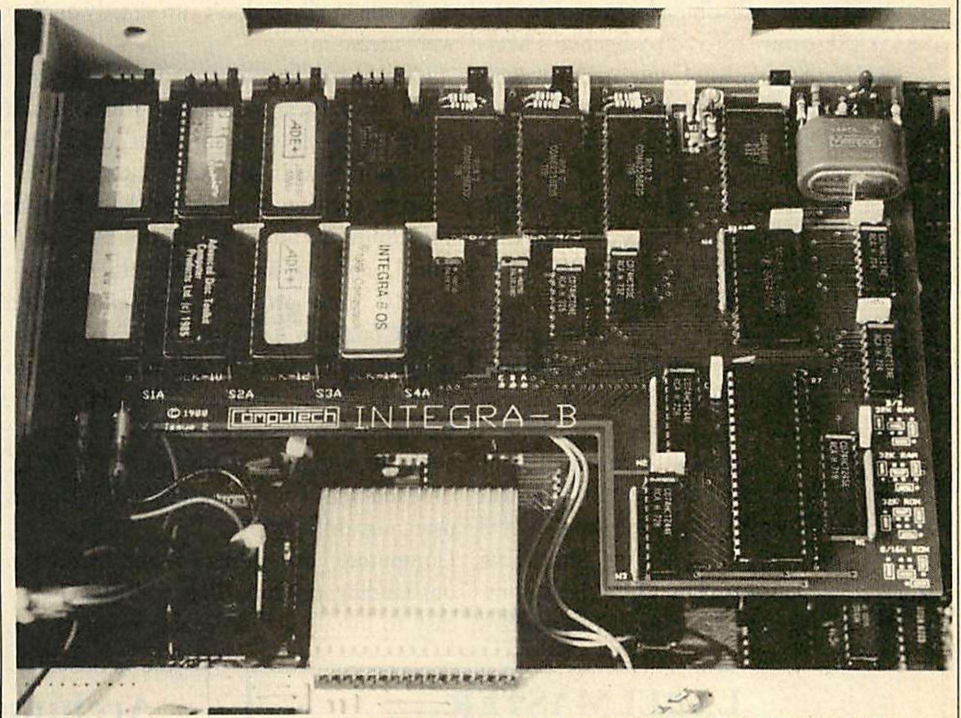
Although the Master 128 has been around for over two years, not everyone has upgraded. BBC B owners have a perfectly good computer, and many aren't ready to put their B on the scrap heap. But most of these people would love to change their model B into a Master. It seems hard to understand why no one has managed to build a comprehensive expansion package with everything on a single board. With its Integra B board, Computech has come up with an interesting answer.

The Integra-B expansion includes sideways RAM, extra sideways ROM sockets, shadow RAM, private RAM, battery back-up and a real-time clock. On the left side of the board are eight sockets which can be used for plugging in sideways ROM or additional RAM into which ROM images can be loaded from disc. At the rear of the board are four RAM chips which provide 64k of sideways RAM, a 20k shadow screen and 12k of private RAM. The remaining chips concern the real-time clock and battery back-up, plus some buffer chips.

The Integra-B takes you to the limit of sideways ROM and RAM, with eight sockets on the board, four sideways ROM sockets on the BBC board, and the four banks of sideways RAM. This combination is far better than the real Master, as the B ROM sockets take 8k, 16k, 32k ROMs, or extra RAM chips.

Computech does not supply any write protect switches for the sideways RAM, but there are two jumpers for write protection of RAM banks, 4, 5, 6 and 7. The Integra-B board easily fits inside the casing of the BBC Micro. It sits in the rear corner by the power supply, not over the RAM chips, making overheating problems less likely.

As with most ROM/RAM expansion boards, it is necessary to remove the main 6502 chip from the motherboard, and insert it into a socket on the Integra-B board. Self-adhesive strips hold the board along the walls of the casing, and the other corner of the board is plugged into the old 6502 socket, holding the board securely in position. Another considerable improvement is how the Integra-B is wired to the BBC. Too many of the early sideways RAM and ROM boards were difficult to connect up. With the Integra-B, three coloured control leads are used – and they are also identified with letters on the board. Each goes to a link on the main board, and the only other connections to be made are for power.



The board fits into the near corner next to the power supply, and requires five PCB connections.

Inserting the Integra-B board is very simple. The most difficult job was extracting the 6502 CPU and putting it into the Integra-B. The legs of the header plug used are of the highest quality – neither thin and flimsy, nor so thick that they ruin the original 6502 socket. When you start to fit some sideways ROM chips you realise what a good system Computech has designed.

The Master's Operating System (OS 3.20) has a range of additional star commands which make the computer easier to use. The service ROM offers a number of these. You can use *APPEND to add to existing files. *SPOOLON is similar to the *SPOOL command but it appends to the end of a file rather than creating a new one. A list of active ROMS is displayed with *ROMS, and there is *UNPLUG to disable a sideways ROM without physically unplugging it – ideal for star command clashes.

*SRLOAD loads a file into sideways RAM, but unlike the Master 128, there is the extra I parameter used by the Master Compact. Clearing out sideways RAM can be a problem with the Master 128. The Integra-B provides a new command, *SRWIPE, for this. The Master *SRDATA command is missing, but Computech intends to release an upgrade version of the software which will include it.

As the Integra-B also has battery-backed RAM, it is able to store the computer's start-up configuration. *CONFIGURE sets a configuration option, while *STATUS displays the current settings. Sixteen separate options are provided, but configurations can be saved and loaded from disc too – an outstanding addition.

The real-time clock on the Integra-B board, and the set of commands used for giving the time and date, is comparable but not totally compatible with the Master. *TIME is the same, and responds with the day, date, and time. *DATE will display the

HARDWARE

date in the format Wed, 21 Dec 1988. But there is no PRINT TIME$ statement. This also means that TIME$ cannot be used to set the time and date. So setting the time is done with *TIME = 15:45:30.

There are a number of upgrades available to the Master's real-time clock, such as the *ALARM feature offered by Beebug's Master ROM. Strangely, Computech doesn't offer anything like that. But there is *CALENDAR, which will display the current month, and a whole host of date calculations are also offered – for example, what day of the week a certain date falls on.

New star commands include *BUFFER, used to set up a printer buffer between 8 and 64k; and *BOOT which is similar to a *KEY 10 command, except that it effectively programs the main power switch instead of the BREAK key.

It's alright permanently altering your Model B to nearly be a Master 128, but what about being able to run it as it was before you expanded it? Computech has thought of that too. The OSMODE command sets the machine to act as a standard model B, a BBC B with shadow RAM, a BBC B+ or a BBC Master 128.

When you add non-standard hardware to your micro, there are bound to be difficulties using certain software. ROM software can be a particular problem. At worst they don't run at all, or don't run exactly as they were meant to.

One of my favourite pieces of software, AMS Stop Press publishing package, can cause problems with some manufacturers' expansion boards. But with Integra-B, everything seems to work perfectly. All of the View suite are fine, especially View Professional, and so are all the other Acorn ROMs. Some problems were experienced with Computer Concepts' Inter series, particularly with Inter-Word, mainly due to the way Mode changes occur. However, Computech has put two new configuration commands into its controller ROM, SHX ON and SHX OFF, which should solve this particular difficulty.

Computech has designed and made an outstanding product. It is well built, very easy to install, and is reliable in operation. The physical stability of the board is outstanding. As Integra-B is an all-in-one board, the normal compatibility with other expansion boards is no problem.

After using the board extensively, it seems a highly successful and effective means of combining sideways RAM and ROM, shadow and private RAM, a real-time-clock and battery back-up.

My only concern over the Integra-B is one of cost. At £135, it is very expensive. This is underlined when you look at the trade-in deals offered by many dealers. So is it worth paying out around £135 for an Integra-B board and adding it to your old BBC, when you could trade up to a Master 128 for a bit more?

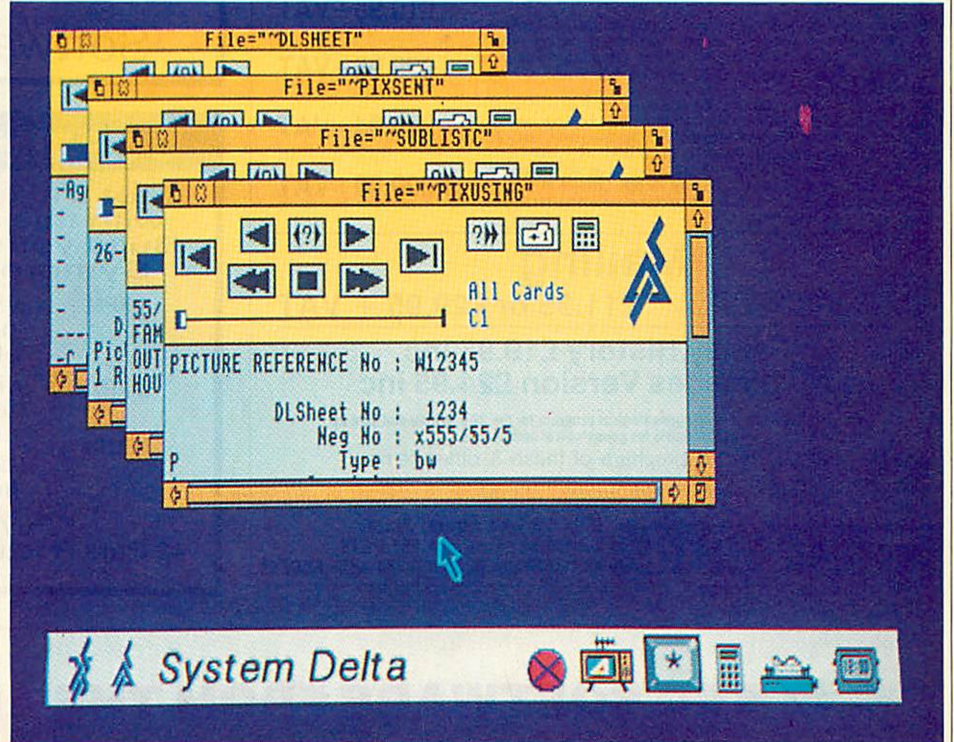
You can expect around £225 for an issue 7 BBC B, making the cost of a Master about £195. The Integra-B costs £135 – and remember that you don't have the ADFS, View, Viewsheet, the Editor, nor the extra graphics commands in the new operating system. However, if you really want to Masterise your B then the Integra-B is an upgrade path worth following.

PHOTOGRAPHS ON FILE

Sam and Richard Greenhill test System DeltaPlus in a real-life environment

The latest offering from Minerva Systems is its second database for the Archimedes, *System Delta-Plus*, which can operate within the WIMP environment. It is the true successor to *Deltabase*, which was mainly a BBC micro conversion. The program stretches the Arc's power, speed and capacity to a good length : Minerva claims a possible total of 2.4 billion records, and 16 million fields – the sort of figures that could be safely associated only with a powerful computer like the Archimedes.

The best way to review a piece of software is to try it out in a real situation, which is what we did. We run a photographic library in North London which comprises more than 150,000 pictures, of which roughly 7000 are out on loan at any given moment. However only about 10 per cent of these 7000 are used in books or magazines and the other 90 per cent are returned unused. A trusty BBC micro currently keeps track but, as time passes and the library expands, its memory is bulging and it is becoming just too small. The perfect field test for *System Delta-Plus* was to try it out in place of the BBC, and at the same time create a better management system for our library.



Four Files on screen – all can be searched at the same time

WIMP demo

First we examined the WIMP card index program supplied on the disc, to see if it would suit our needs.

After making a copy of the original disc and booting it up, you are presented with a menu page (largely taken up by a spinning *System Delta* logo). Pressing 'W' selects the WIMP card index program and puts you in the work area for the database. Here you can call up a menu which has two main elements. These allow you to open files and create new layouts, and there are also small desktop icons calling facilities such as a clock and a calculator.

The manual provided with the system is worthy of a commendation, especially for its experimental section – a practically vital component for such a complicated package – although I feel they could have gone into more detail in certain places.

A number of demonstration files are provided on the disc for use in combination with the experimental section to help you get to know the system. One of these contains information on imaginary people – names, addresses, etc – as a simple example of what can be done.

When you open this demo file, the computer displays the first card in the file, along with a control panel that resembles that of a cassette recorder. You can browse through the file using 'fast forward' and 'rewind' – but if the file has 2.4 billion records in it, this could be a rather tedious exercise. Don't worry: *Delta-plus* provides an extensive search menu which covers practically everything from a simple 'find card' routine to a complex inquest deep into individual fields.

However, believe it or not, it takes a long time to search for specified criteria. When I tried it it took 20 seconds to get through 60 cards. I would hate to see how long it would take to get through the 2.4 billion that Minerva claims it can handle. But if you assign a field to be a 'key' one when creating the layout, the computer will find criteria almost instantly if you use the Card Search icon which sits beside the fast forward and rewind. You can also add cards, according to the demo file's layout specifications, and alter records.

Once the many features involved in viewing the cards have been mastered, the manual suggests you attempt to create a layout of your own. This is achieved by calling up the menu and clicking on File Creation. After confirmation, the disc drive starts up and spends a long time loading in the new program. Long waits while the drive does its stuff are quite common and can become a little annoying. Archimedes 440 owners will be pleased to learn that *System Delta-Plus* is compatible with their machine, which means they can copy the programs over to hard disc, greatly reducing loading times.

Choosing the Create New File option and entering a filename provokes the disc drive into another session of spinning while you watch and wait. Then you are presented with the framework for a card design

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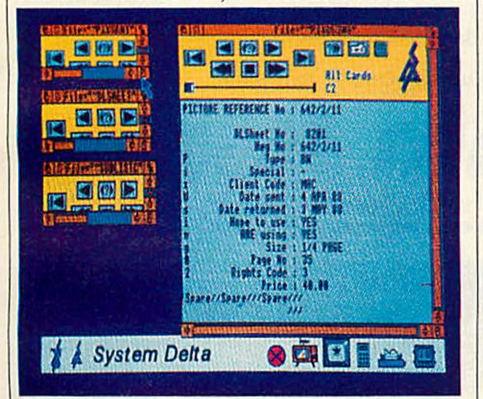
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which you can mould into almost anything you like. You initially have only 79 vertical lines by 26 horizontal ones, but this can be expanded to 255 by at least 80,000.

Using the mouse and keyboard you can type in various titles like 'name' or 'address', then allocate each title a field, using a field definition window which specifies many aspects of the field such as whether it is a string or a number, and how many decimal places the number would have (for instance, prices would always have two). You can also nominate it as being a key field for use in searches. And you don't have to worry about getting it right because it is possible to modify existing layouts. (You should read up on this first for, when I tried it, it wiped my file. Minerva has provided plenty of warning boxes, which can be switched off, but there should be a special, preferably permanent warning.)



Three Files can be used as icons or menus

The layout designing program offers a great deal of versatility, which is important to experienced users who intend to get the most out of the system. The person who is assigned the job of entering all the information on each card will be grateful for the inclusion of the advanced maths utility, which allows just about anything Basic can do. An example of simple maths is for the computer to calculate the age of a person from the given birth date. This would save the user having to type out both each time.

System Delta-Plus is capable of multitasking: up to four files can be loaded in at once, and then, for example, all four can be searched simultaneously, or three can be searched while the other one is worked on. The WIMP card index program is very user-friendly, but can also be very advanced, making it ideal for both the novice and the expert. However I have three niggles. First, when in the file creation mode, it would have been nice to have had the environment of a wordprocessor, or at least an insert/overwrite key, and definitely the capability to insert blank lines would be useful. Second, the fields and the titles should have optionally different colours, which should be different from the background. An empty field is invisible until the caret, or cursor, is positioned on it.

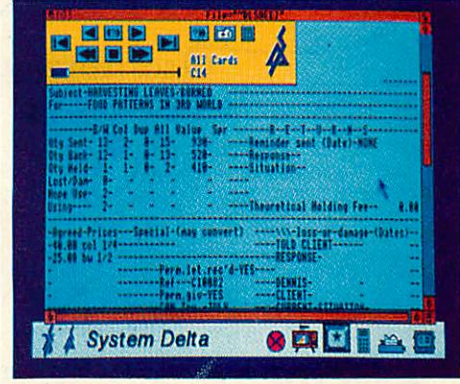
My third complaint is that when creating files, typing is surprisingly slow, and resembles that of the disastrous *ArcWriter* – but don't worry, this doesn't affect the routine of adding records so it is not likely to be encountered often. However my complaints are very minor and overall Minerva Systems have created a superb, powerful database.

The module

That's the database, but that's not all that's on the disc. The WIMP card index program is simply an example application of the module it works off. Minerva publishes a manual describing the use of the complete *System Delta-Plus* module with your own programs. At £29.95 it is a bit of a rip-off, but it is good and unfortunately also necessary if you are planning to use the module in your own programs. The module can be loaded in via your own program and acts as a ROM would, allowing you to call up special procedures using star commands. This could be especially useful if you have a knowledge of programming and need to use the system for something the WIMP card index cannot do. This was the case for us when we bought *Delta-Plus* for use in our photographic library.

The photo library software must be able to perform three fundamental functions: to gather all the necessary information for sending out pictures, to deal with returned pictures, and to invoice clients. It also has to generate reminders for overdue pictures, and be able to provide information about every picture that is out.

Each photo in our library has a bar-code



Delivery note on screen

DELTA FOR SCHOOLS ADMIN

If you have to prepare school class lists, examination entry lists or staffing returns, Minerva's *School Adminstrator* software could be the best buy you ever made. But before you write the cheque for £69.95, read about its limitations.

First you must get *System Delta* itself, a good all round database with versions available for every kind of BBC micro. In the case of the basic Model B, it comes in the form of an extra *ROM* which provides universal database commands, a disc providing a Card Index application and an 84-page A5 manual. That costs £65 on its own, but has many uses apart from school administration.

You then need the *School Administrator* disc for the additional £70. It comes with a similar 39-page manual and, although I liked the package, I did not like the print style of the manuals, which are closely typed on a matrix printer using a bold typeface.

In theory anyone using *System Delta*, or any other reasonably comprehensive database, could construct such a package on their own – given time. But buying it ready-made saves much hard work and possible irritation. It would be suitable for most normal schools but best at secondary level where examinations are a feature of life. It holds a file of pupils with their addresses, gender, dates of birth, classes and examination courses. Similar files for teachers and for the examinations can be maintained.

It can then print out selective lists in most of the orders and formats you are likely to need, including the dreaded DES Form 7, plus examination timetables with the cost of entries which is set up once a year. The package even has its own built in calculator. All that is ideal, although you'll need to use a printer with a wide carriage to make a neat job.

To my mind there is less flexibility than if you designed it yourself and I did have a few niggles. The browsing facility is not so easy to use as it should be, the manual made finding information less than clear, and a print 'abort' button would be a good idea.

Overall, *School Administrator* is pretty good and, if the other specialist applications are as useful, Minerva Systems deserve to be congratulated.

Roger Carus



stuck on the back, and the BBC reads this when the picture is being sent out or put back in. This way the computer can keep track easily without the librarian having to type out a special code on the keyboard. Clients do not usually send pictures back in one go – they come in bits and pieces here and there, with more going out at the same time, making us even more grateful that it is the computer which has to puzzle it all out.

The WIMP card index program could obviously not support all our requirements, mainly because it cannot handle a 'relational database'. The library software that deals with invoicing must get its information from the main file which contains the information put on it from the 'sending out' and 'returned' programs. The program goes through a process that resembles that of a tree growing.

For example, a client, let's say a magazine, may have published our pictures in anything up to 10 issues. This cuts the tree into 10 branches. On each branch/issue there can be up to 10 pictures, producing another 10 branches. There may be more than one file open, and a client may have an issue to be invoiced in each.

The card index program can do this but it cannot relate across files. Although up to four files can be open at any time, these are totally isolated from one another, and cannot be linked. Because we needed a utility whereby the files could relate to one another, we had to use our own software.

```
DLNo- 8201-CCode-MAC      -MACDOUGAL PUBLISHING LTD. -SFNo-  3567-£13.80
Date-4 APR 88 -Date for Return-4 MAY 88 -DCode-   36782-Type-2-VA-=15.00
Contact-ELIZABETH HUGHES              --Contact-ANNE JENKINS
Address pictures sent to ------------Address for Invoicing ------------
MACDOUGAL PUBLISHING LTD.             --
8-18 ARVON ROAD                       --
LONDON                                --(same)
W1 8YF                                --
                                      --
                              ---------                          -------
Subject-HARVESTING LEAVES/BORNEO      ----------------------------------
For-----FOOD PATTERNS IN 3RD WORLD    ----------------------------------
------------------------------------------------------------------------
---------B/W Col Dup All Value  Spr -------R-                      -----
Qty Sent- 13-  2-  0- 15-   930-
Qty Back- 12-  1-  0-
Qty Held-  1-  1-  0-
Lost/Dam-  0-  0-  0-
Hope Use-  2-  0-  0-
Using----  2-  0-  0-                                                .00
-----------------------                                             ----
-Agreed-Prices---Speci                                              )--
-40.00 col 1/4--------                                               --
-25.00 bw 1/2 --------                                               --
-             --------                                               --
-             --------                                               --
-             --------P                                              --
----------------------C                                              --
-C US rights would ---I                                              --
-O be 50% extra    ---Da                                             --
-M                 ---Da                                             --
-M (They also will -----                                             --
-E need similar    -----                         -ICE-NO-   0-PAID?- --
-N age later)      -----
-T                 ---------------------------------Message on the------
```

Printout of delivery note on page 121 from Delta Plus, with the photo to which it refers

Application to order

The WIMP card index program may not be totally suitable for our needs, but we are going to use it as the core of our system. The information on every picture will be held on a record in a file of the *System Delta* format. That way we can access it from either our own programs using the module's star commands, or from the WIMP card index program.

The way we are organising our office software is to go into the WIMP card index program to design a specific layout for information about our pictures. Then, having set up this file using Minerva's program, we can simply access it from within our own software. And when we need to make alterations we can use the nice convenient method and go back to the card index program to alter the records directly as required by the circumstances.

The card index program also provides the rapid searches that we need – something that we would find too difficult to program ourselves. Minerva's software makes it possible to have all our own requirements in our own programs, but with the potential to actually 'see' the file we are working from using the ordinary card index.

Every program on the library software disc will access the file created on the WIMP card index program to enter or extract information. For example, if a picture is overdue the computer will inquire whether it should send out a reminder. If you reply 'yes' then it will look at the file and take the name and address of the client and the photo numbers and dates. It will compile these on a set reminder layout sheet and print them out. As long as all the information per picture is available on the file, then each program can read the necessary items, and generate the required result without having to look at every item on the file, which saves both memory and time.

We haven't finished our library software yet, so there may be more unforeseen difficulties, but so far *Delta-Plus* has calmly solved any problems, and passed every test. It looks as though it will perform usefully in our office, with the minimum of fuss, and with less of our own programming than was originally anticipated. Also I wouldn't be surprised to discover other wonders in the WIMP card index program – and, indeed, other problems.

If writing your own program is a daunting thought, Minerva provides an answer. Simply add to their own software. The WIMP card index program is written entirely in Basic and is well structured too. The programmers obviously took full advantage of the Arc's memory and wrote it very systematically and logically, making it a pleasure to interface with your own workings. The program is not protected and it is intended for you to be able to modify it. Apparently there is even a dummy procedure put in which the program calls, so using the Archimedes' EDIT command, it should be easy to insert your own programming within this procedure for the card index program to call. Minerva seems to think of everything – except that that my very early version (0.001) doesn't appear to have this handy facility.

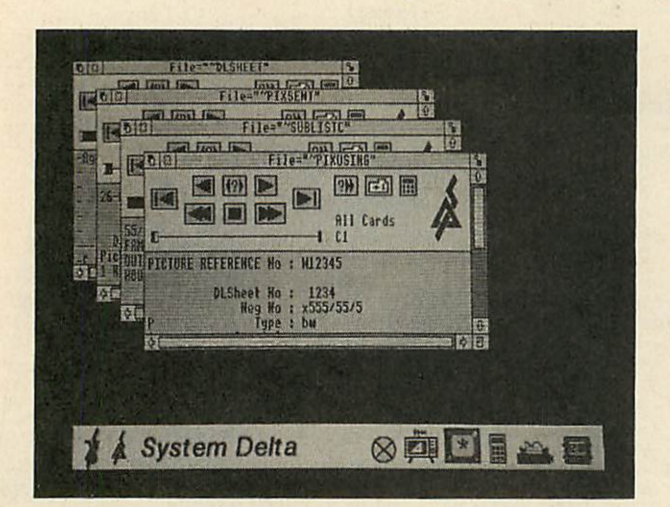
If you have an Archimedes and are looking for a database, *System Delta-Plus* could be precisely what you are looking for. It does everything a database should do and more and, because of its unique ability to be blended neatly into your own programs, it is totally flexible and may easily be adapted to suit your particular application.

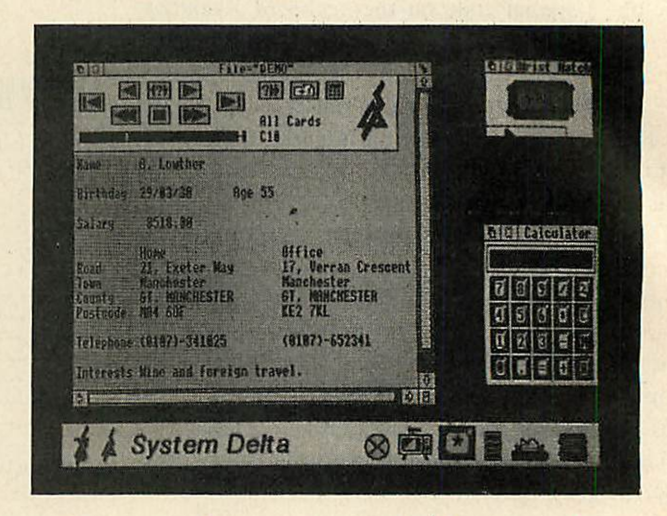
There is no doubt that *System Delta-Plus* is a remarkable achievement in programming, and a prime example of what the Archimedes is capable of. Other software houses please note.

System Delta-Plus and WIMP Card Index, £69.95 from Minerva Systems, 69 Sidwell Street, Exeter, Devon EX4 6PH; tel (0392) 377560.

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*Mailing labels with line compaction
*Comprehensive, yet simple, reporter facility
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Archimedes owners who buy the *System DeltaPlus* database and *WIMP Card* through *Acorn User* will be sent a free Minerva Systems voucher worth £15. This voucher can be used as part payment on any software bought from Minerva.

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I enclose my cheque/postal order made payable to Minerva Systems Ltd for £______
Please charge my Access/Barclaycard
Acc/No ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐
Expiry date ☐☐☐☐
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LOGO ARCS OVER

A new language for the Archimedes: possibly the fastest Logo in the world?

Dave Futcher

In the world of programming languages, Logo has much to offer. Infact, some people consider that one day it could replace Basic as a first language because of its suitability for structured programming and modular problem solving, and its extendability.

But Logo should not be relegated to being an 'an educational tool'. It is relevant to the general computing community too.

Maybe the release of the most powerful version yet of Logo, for the Archimedes, will see it used more in real-world applications.

One thing that is certain is that Archimedes Logo is *not* 8-bit BBC Logotron Logo on the Archimedes in 6502 emulation mode. That would be a bit like putting an old Volkswagen Beetle engine into brand new Golf GTI. Archimedes Logo is 114k in length and is all in memory, but the authors have worked hard to make Arc Logo compatible with BBC Logo. The only major changes are the dropping of the NODES primitive and the replacement of the USE command, which loaded in extensions, by INSTALL. In addition, the dot before the SETNIB command has been dropped.

Whereas the original Logotron Logo had 129 primitives, Archimedes Logo has 234. These include a number of primitives that were previously on the BBC Logotron Logo extension disc. Parts of the powerful list processing kit module uLISTS are included: ELIMINATE, INSERT, GPROP, PRROP, PLIST and PPS. Also included are two graphics primitives, DOT and FILL, from uGRAPH.

The package

Archimedes Logo arrives on a standard 3.25 disc, which contains the main program, some extensions and some sample files. Also supplied are two manuals and a keystrip. One of the manuals is a first rate tutorial guide, which is far better than *The Logotron Logo Book*, with lots of easy to understand explanations and sample programs. The other manual is for reference, with about 300 pages providing details on the primitives.

Starting up

Starting up Archimedes Logo could not be easier. It is just a question of putting the disc in the drive and booting it with the Shift-Break key combination. (This installs the ARM floating point emulator and then loads Logo). The screen clears and you are in mode 0. A header is followed by the version number with a pleasant 'Welcome to Logo' message and the familiar question-mark prompt with a flashing cursor.

If you type in some turtle graphics commands, the screen clears, the turtle appears in the centre and the first command is implemented. The prompt is then located six lines up from the bottom. If you carry out some other activities, such as list processing or some arithmetical calculation, this is carried out initially on the copyright header screen.

1988 ACORN USER LOGO SURVEY

	Mac	IBM-AT	BBC	Arc
SEIVE50	4	4	18	1
HAMLET	13	5	9	1
WILLOW	78	47	123	13
STREET	26	24	49	5
AVERAGE	30	20	50	5

All times are in seconds to the nearest second. All graphics benchmarks were tested with the turtle visible (all versions increase their speed with the turtle hidden).
Anyone who wishes to replicate this work on the Archimedes or the BBC micro will find the four *AU* Logo benchmarks on this month's magazine disc.

A large part of Logo's reputation has derived from what has become known as turtle geometry, a simple but straightforward means of creating pictures on the screen. There is no limit to what turtle graphics can do, so the images can become quite complex as children develop notions of pattern.

But there is a lot more to turtle graphics than moving around the screen. It is possible to move the turtle in relation to its screen position using X and Y co-ordinates (SETX and SETY). It is also possible to send the turtle to a new position with SETPOS. PRINT POS tells you where the turtle is, and PRINT HEADING tells you in which direction it is facing, in degrees.

There are a number of commands for controlling how the turtle 'marks' the screen. It can have its pen up (PENUP) or down (PENDOWN). The colour your turtle draws with can be changed with the SETPC and the pen can have a range of different nibs which allow it to draw different kinds of lines. This is done with SETNIB for some attractive effects.

The powerful SETPEN command controls all the turtle's pen parameters at once.

As if that were not enough you can change the turtle's shape from its normal triangle, by using the SETSH primitive. The turtle shape could be a letter: SETSH 74 would make it J. It is also possible to redefine it to a new graphics shape, as certain ASCII code values have been left to be defined by the user with the VDU 23 command.

Simple animation can be easily created by changing the turtle's shape twice. For instance, swapping between two bird shapes with wings in the up and down position makes a bird appear to fly.

Archimedes Logo makes good use of the Arc's superb range of colour graphics. It can work in any of the screen modes available on the Archimedes, but some are more suitable than others (turtle graphics cannot be displayed in text-only modes).

The graphics mode is set by the primitive SETMODE, and the background colour can be changed from the default black by SETBG. The SETPAL command sets the logical colour to a particular physical colour and can be used, for example, to change the foreground/background screen colours.

With Archimedes Logo even the graphics aspect ratio (the ratio of vertical turtle steps

to horizontal turtle steps) can be a useful command for correcting distortions arising from from non-standard displays. It can also be used to deliberately distort figures drawn by the turtle.

Numeric primitives

The more complex procedures you write in Logo, the more arithmetical expressions come into it. Archimedes Logo provides a full set of facilities that will allow you to add, subtract, multiply and divide numbers. Primitives are also available for trigonometric and other functions.

Archimedes Logo uses infix notation as well as prefix notation, which means that PR 4 + 5 will work as well as PR SUM 4 5 just as 'four plus five' can also be expressed a 'add four and five'. When Logo meets a mixture of prefix and infix notation it always carries out the infix operations first.

A number of primitives are provided for simple prefix notation operations: for example, SUM adds the numbers that follow it; PRODUCT multiples numbers in the same way.

Word power

As Logo is derivative of Lisp, the language used in artificial intelligence, it has inherited Lisp's ability to manipulate words and lists. Archimedes Logo has several commands for taking words and lists apart. FIRST identifies the first element of a word or list, LAST the last element. BUTFIRST (BF) removes the first element from a word or list, and BUTLAST strips the last element. COUNT tells you how many elements are in a word or list. There are also commands to combine words and lists. FPUT adds a new word or list at the beginning of an exciting list. LPUT adds a new word or list at the end. Two commands enable Logo to read messages from the keyboard: RL reads the first line typed, and RC reads the first character. SENTENCE (SE) combines two or more lists, while WORD works similarly to combine words. ITEM identifies a member of a list by its position.

The editor

Archimedes Logo contains a powerful interactive editor, called by typing EDIT. If you have not previously used the editor during that session, the screen will be blank, otherwise the last procedure is displayed. If an input is included like EDIT "STAR, a copy of the specified procedure and/or variables is transferred to the editor.

To edit more than one procedure you simply enclose the names of the procedures in square brackets. To work on all the procedures you have created, use EDALL. The arrow keys combined with the Shift key are used to move you around the page, together with some of the function keys that move and scroll the text in the editor, as if it was a word processor. The Delete key and keys F0 and f1 handle insertion and deletion of characters and blocks of text. This includes some clever use of a 'kill buffer'. In addition, the function keys give access to a set of powerful 'Find and Replace' facilities.

You can also define a procedure using the editor instead of TO. This sometimes can be more convenient, because if you make a mistake as you are defining with TO, you have to use the editor to correct it anyway.

Workspace management

With the Archimedes 310 a very healthy 500k to 600k should be available, while on the 305 more than 100k of memory is available.

When you define a procedure it is stored in the computer's memory, the workspace, until the machine is turned off. You can save the whole Logo workspace to a file or you can be more selective, and save one or more procedures by their names, in a file with a new name. The LOAD command usefully signals, as each procedure loads, with messages on the screen.

There are commands that allow you to examine the variables and procedures: PO prints the definition of one of more procedures and variables, and POALL prints the definitions of all procedures and the contents of all variables in the workspace. You can also erase them from the workspace with ERALL, which does not, however, affect procedures that have been 'buried'. Neither does it affect property lists, as a separate primitive ERPLISTS performs this function. ERASE (ER) is the command that erases selected defined procedures or variable from the workspace.

Adding extra modules

External modules containing special primitives or extensions to Logo can be loaded into Archimedes Logo workspace by using the command INSTALL (the equivalent of USE in the BBC version. Unfortunately the additional primitives are only TELL, WHO and ALL. It is a shame that there are no speed commands, so there is nothing to offer the power of Sprite Logo.

As well the TURTLES extension, a number of toolkit extensions are provided on disc. These include:

TOOLKIT – provides the primitives WHILE, DO-UNTIL, UNTIL DO-WHILE, CASCADE as well as some others for working on lists

ARRAY – a set of primitives that give Archimedes Logo arrays

TOOLS – containing the BUTTON, MOUSE and RESERVE primitives

If you have a group of procedures that rely on a particular module, you can call it with a setup procedure which will automatically call and install the module.

Logotron already has three extension modules planned which are certain to add extra power to what is already a most impressive package.

Logotron Archimedes Logo: £69.
Logotron, Dales Brewery, Gwydir Street, Cambridge CB1 2LJ, tel (0223) 323656.

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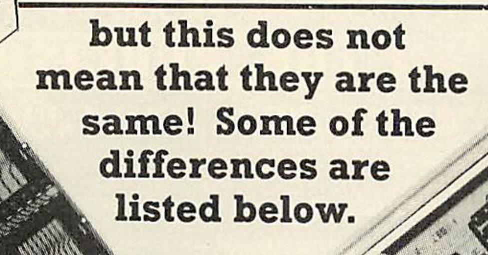



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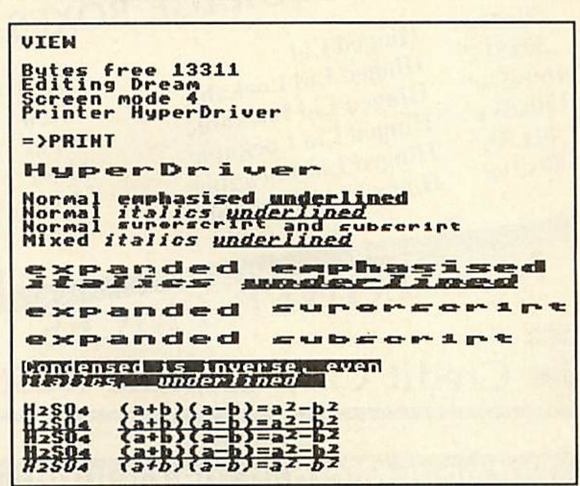
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LETTERS

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ARCHIMEDES GROWING PAINS

Sir, I have been looking at the Archimedes computer and have to say how disappointed I am in Acorn, for designing such a poorly expandable machine. The A300 series has only one megabyte of memory with no way of expanding it, even though the memory controller MEMC will address up to four megabytes. This severely limits the use of the computer for memory intensive applications such as hi-res graphics or desktop publishing.

The Beeb had both a user port and ADC port as standard, with the option to 'daisy-chain' as many devices as needed to the 1MHz bus. The Archimedes, on the other hand has none of these fitted as standard. Devices such as video digitisers must be limited to two, and then only after fitting a back plane. Considering the computer costs at least £800, the back plane should have been fitted in all machines. Also, the 400 series contains a 4-slot back plane and I can see no reason why this should not have been included in the 300 series.

Is this the view of many readers or am I alone in my stand?

R York
Leicester

TERMINAL ADVICE WITH KERMIT

Sir, In the March issue of *Acorn User* there is a letter asking for details of a comprehensive terminal emulator package for the BBC micro.

We use the *Maya Comms* package (sold by Technomatic) which seems to cover the reader's requirements.

One important extra feature is the implementation of the Kermit protocol. This allows us to transfer files between IBM 4381 main-frames, Tektronic 4132 workstations and Norsk Data ND500 minicomputers.

In addition, it is the only BBC micro comms package that allows you to work with the Unix editor 'vi'. This terminal emulation allows graphic vector dumps onto a plotter (the Plotmate A3M) using the HPGL language.

The package is compatible with the Model B, B+, Master 128 and even has a module to run on the Archimedes.

Eduardo Ramirez
FFS Medical Research Centre
Norway

Technomatic can be contacted at 17 Burnley Road, London, NW10 1ED, Tel: 01-208 1177. We hope to be covering the Kermit protocol in a future issue of *Acorn User.*

TAKE THEME MUSIC FURTHER

Sir, I read with interest Richard Commander's letter in *Acorn User*, April 1988, and noted particularly his pleas for (a) more storage space for music in the David Lawrence program *Theme (AU* April 1987) by using Shadow RAM and (b) change of tempo in smaller steps. I too encountered these very same problems and hasten to point out that your solution to the first does not quite go far enough.



Theme screen from '87

To double the memory by taking advantage of Shadow RAM in *Theme* it is necessary to make the following alterations to the program:

```
  80 MODE 132:HIMEM=&4C
00:VDU 19,1,6;0;
 470 c1%=&4C00:c2%=&540
0:c3%=&5C00
 490 notes%=1024:mem%=2
*notes%
3680 A%=&54+s%*8:CALL &
9C0
4290 FOR I%=c1% TO &640
0
4510 IF 1%<>&1818 AND o
k% PRINT'"Not a"'"Music"
'"file.":ok%=FALSE
4590 FOR I%=&4C00 TO &6
400
4730 p%=?(&4C00+I%*&800
+J%)
4740 d%=?(&4C01+I%*&800
+J%)
4770 J%=J%+2:UNTIL J%=&
800:add%=add%+16
4840 FOR J%=0 TO &7FE S
TEP 2
4850 p%=?(&4C00+I%*&800
+J%)
4860 d%=?(&4C01+I%*&800
+J%)
```

To halve the tempo steps (it would not be practical to reduce them any further than this) the following alterations will suffice:

```
 520 nkey$="":rkey$="":
T%=3:end%=FALSE
1190 PRINTTAB(32,12);"T
empo: 3"
3690 SOUND v%,V%,d%*(T%
```

And in Dave Acton's Autumn file player (★PLAY), add the following lines:

```
1921 INX
1961 LSR A
2690 IF total%<>52575 P
RINT "Checksum error - p
lease check listing"
```

I share Mr Commander's desire for improvement by the provision of triplets – but what about ties and slurs?

Pat Peugniez
Hexham

A PLUG FOR SOUND

Sir, I recently received a Master 128 to replace my old and rather decrepit Beeb.

I noticed a socket on the back panel marked 'AUDIO OUT'. I have tried to find a suitable plug for it but to no avail.

Could you please tell me where I might purchase such a lead so that I can connect my Master to my amplifier?

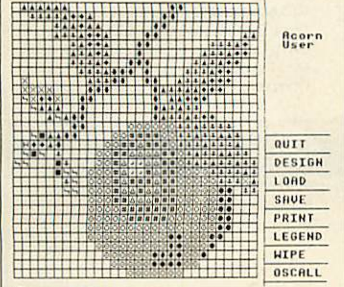
Ben Wheeler
Essex

The Master 128 can be connected to an external amplifier via a standard phono plug. These plugs, which are normally either red or white, can be obtained from most hi-fi dealers. You should join the plug to a length of single co-ax cable and split the cable to the two jacks. It is important that you do not connect the cable to your amplifier through the microphone input, as the input level will be too high and could do untold damage to your precious equipment.

LETTERS

STITCHED UP BY PAGE

Sir, After bemoaning the fact that there aren't many computer programs written for women, I was leafing through my old *Acorn Users* and found *Cross Stitch* by Anneke Sicherer-Roetman in the February 1987 issue. After typing it in and checking it through, I cannot get it to run on my Master 128. I feel it is some-



Cross-Stitch peach

thing to do with PAGE – after chaining STITCH the program starts to run, then I get 'No room at 1720'. Have you any suggestions?

I have one other problem. In the Variable and Procedure list that accompanies the listing, I find the variables c1% and co1% whereas, in the listings, the variables are printed as cl% and col%. Which is correct? Apart from this minor hiccup, I enjoy *Acorn User*, even though I am a female of mature years battling with modern technology!

Mrs G Alexander

There have been no errors reported with the Cross-Stitch program, although you may experience problems with the program if the PAGE setting is incorrect. You should therefore set PAGE to &1900 (ie, PAGE=&1900) before running STITCH.

There was a discrepancy between the variable in the variable list and the listing itself: cl% and col% are correct.

SCIENCE EXTRAS

Sir, I have just bought an Epson LQ-500 and I am very pleased with it. There's only one problem – I want to use extra scientific characters but the manual gives no indication of how to obtain these. Where can I find this information, or do I have to purchase a complete software package (most of which do not, as yet, cater for 24-pin printers)?

H Brindley
Cambridge

We will be reviewing a selection of 24-pin printers, including the Epson LQ-500, in the August issue. Explaining how to design new characters is beyond the scope of the Letters page, although we hope to be covering this topic soon.

There is now quite a lot of software being released that supports 24-pin printers; in particular, packages for the Archimedes such as First Word Plus. There are also several scientific wordprocessors that provide the extra characters and drive 24-pin printers. Two are scheduled for review in August.

FOOTER QUERY

Sir, I am writing in the hope that you at *Acorn User* might be able to solve a few of my wordprocessing problems. I am unable to use underline or bold highlights and cannot understand how to use the printer driver generator. I cannot see how one uses the printer commands and Escape codes, as Escape only toggles between the command and edit screens.

My final query is that I cannot get the positioning of headers and footers correct. Just when I've got the header in the right place on the page, the footer will occasionally drop off the bottom. I've tried changing the page length but without success.

Address supplied

The use of Escape codes and printer driver generators were covered in Hints & Tips in the October 1987 issue of *Acorn User*. Bruce Smith's book, *View; a Dabhand Guide*, covers all aspects of *View* including Escape codes.

The incorrect positioning of headers and footers can be caused by several things. It is vital to position the paper in the printer correctly. The exact position can be found by experimenting. Different paper lengths will also cause problems. Note that page lengths for A4 and 11.5 inch by 9.5 inch paper are 70 and 66, respectively.

AVID FAN CONVERTED


Master: complete with View

Sir, As a former Beeb user I was an avid Computer Concepts fan, and probably still would have been but for the purchase of a Master when it first appeared. After much deliberation and with some regret, I shelved all my CC stock and persevered with the *View* family. I'm now glad that I did and find *View* and *Viewstore* excellent, especially if one is prepared to spend time tailoring some EXEC files.

I use *Viewsheet* but still prefer *Intersheet* for ease of use. *Spellmaster* and *Interchart* still knock spots off the clumsy *Viewspell* and *Viewplot*.

I was therefore very interested to read, in your review of *Overview* in the March 1988 issue, of the definite improvements made to an already excellent product. The bad news was the hundred quid to buy a few commands and 106 columns that the competition had from the beginning.

Computer Concepts has always had excellent after-sales back-up and was never slow to offer users exchange ROMs af-

```
INTER-SHEET
(C) Computer Concepts 1985

1)  Save worksheet
2)  Load new worksheet
3)  Export worksheet
4)  Import to cursor
5)  Set Options
6)  Print worksheet
7)  List formulae
8)  Spool worksheet

ESC worksheet display

Please enter choice
```

Intersheet: easy to use

ter software modifications. Could we perhaps expect the same honesty from Acorn, with an offer to discount the *Overview* package to those who have already invested heavily in *View* Family programs.

Dave Martin
Luxembourg

HELP WITH MIDI MUSIC

Sir, I am writing to ask for information about MIDI, and a BBC micro. I have a BBC micro and would like to find out more about the software and hardware available. I have a keyboard, without MIDI, and I am hoping to get a drum machine soon.

Dominic Shields
Norwich

June's issue covered MIDI in some depth, so take a look at that. Whatever you do, plan before you buy anything. It's not possible to upgrade non-MIDI equipment.

APPLICATIONS FIRST

Sir, The IBM hardware and MS-DOS software standard has been acquiring an ever firmer grip on most of the markets that Acorn competes in, and the entry price of IBM clones has fallen over the years to less than the entry price of Acorn systems. This has generated in many Acorn users a good deal of nervousness as to whether they should continue to buy Acorn or IBM-compatible equipment.

So far, discussion in *Acorn User* has concentrated on operating system compatibility. Acorn's attempts to do this have resulted in the Master 512 co-processor, along with the Archimedes PC emulator.

However, operating system compatibility is not the only issue and, for many people, not the most important. Real users, as opposed to journalists, commentators and software developers, are interested in applications and not operating systems. They don't care whether they are running MS-DOS, Arthur, BBC MOS, OZ or anything else; they do care about whether the work they do on one computer is easily transported and used on another. Operating system compatibility is only one way to provide this, application compatibility another.

Considering one application program demonstrates this perfectly. *Pipedream* provides wordprocessing, spreadsheet and database power; the things that most users spend most of their time doing on their computer. *Pipedream* is available for Archimedes and the PC, as well as being built in to the Z88. It is both keystroke and file-compatible on all of these machines and is file compatible with Acornsoft's *View Professional* on the BBC computer. Files can be ported between Acorn hardware via ADFS discs or Econet, to and from PC hardware via MS-DOS discs (the 512 and PC emulator handle ADFS to MS-DOS conversion easily) or between any of these computers via direct loading and saving to the Z88.

Users choosing their applications carefully need not worry about operating system compatibility.

Rob Macmillan
Coltonsoft
Cambridge

HELP WITH MATHS

Sir, I am preparing a thesis on mathematical investigations and problem-solving using a microcomputer, which includes writing software suitable for use in schools with 11 to 16 year olds.

Have you reviewed any suitable software.?

Mrs C R Rozday
Ripon

Mathematical investigation is a wide area — you could look at the *Spider* software in the October 1986 *Acorn User* for example. We haven't reviewed much software, but a good source of information is the May 1986 issue, which published a list of 200 maths programs.



ACORN USER ADVERTISEMENT PAGES – JULY 1988

FREE ADS

PENPALS BBC B users wanted, swap hints, tips etc. All letters answered. David Obdrzalek, Podolske Nabrezi 3, 19700 Praha 4, Czechoslovakia.
ARCHIMEDES Penpals required to swap ideas etc. J M Read, 250 Hastings Road, Bromley, Kent BR2 8QP. Tel: (0689) 59326.
WANTED BBC B Penpal to swap info and ideas. Also likes hip-hop music. Contact Ive, 39 Dunvegan Drive, Risepark, Nottingham. NG5 5DX.
PENPALS who are interested in computer graphics wanted to start new group. Tel: (0279) 56997 for details.
WANTED 40/80T disc drive £30-£40. Must be in good working order. Tel: Roger (0482) 782272 eves.
BBC OS 1.20 DFS 0.90, £170. Microvitec colour monitor, £90. Epson MX80FT printer, £100. DS/DD 40/80T disc drive, £70. Tel: (0223) 213704.
BBC B issue 7 Solidisk DFS 32k 40T drives - dual, User Guide, Advanced User Guide, basic manual, Mini Office II software, £320. Tel: 01-550 3525 eves.
BBC Master 512 twin 80T discs, mouse, loads of IBM and BBC software. Only £600 ono. Tel: Wakefield (0924) 828361.
BBC B, Viglen console, 40T/80T 400k disc, SW RAM, ROM, £300 ono. 6502 2nd processor, £100. Pen Plotter, £50. Tel: 01-804 6578.
BBC Master (new), Cumana 40/80T DS/DD, small mono monitor, new printer, software, games etc. Bargain £750 (will split). Tel: 01-735 6874.
COMPUTER Concepts graphics ROM plus manual, £20. Tel: Richard on Sevenoaks (0732) 461777 eves.
BBC B, Acorn 1770DFS & speech, Solidisk 4meg/32k RAM/ROM board, many discs, £225. Disc/drive 80T/DS, £65. Acorn Teletext adaptor, £60. Tel: (0992) 34425 after 7pm.
ELECTRON, Plus 1, AP3, DFS & ADFS, 5¼" & 3½" drives, ROMs, mouse, games & mags. Worth £950 for £450. Tel: Robert (0322) 333311 eves.
MASTER 128 40/80T drive, manuals 1 + 2, books, disc games, blank discs, all vgc, £460 ono. WordWise, £10. Tel: John, Windermere 2758 6-8pm.
BBC B, OS1.2, DFS + twin 40/80T drives, recorder, ROMS, 20+ discs, games, business software. Boxed, manuals, leads and accessories, £500. Tel: (0702) 611448.
BBC B, 40/80T disc drive, vast amount of software to go with it, £300. Tel: Basingstoke (0256) 72 2390.
BBC B SW ROM/RAM (Watford) with InterWord and Beebug C, £70 ono. Hardly used, with manuals. Tel: Harpenden (05827) 60615 eves.
PLUS 1, £20. Solidisk EFS, £17. Misc software for Electron, £20. Tel: (0475) 37901 eves.
MASTER 128k, £300. Technomatic PD800P drives, £160. FX80, £80. ADE+, £30. ADI, + ROMS, manuals, Acorn User mags, offers? Tel: 01-672 7322 eves.
MASTER 128, dual DS/DD 40/80T drives, NEC-printer, InterWord, Fleet Street, double plinth, blank discs, software, lightpen, discbox, AU/MU magazines, £550. Tel: (0206) 853101.
VIEW 2.1 ROM plus manual also printer driver for many printers, £30 ono. Tel: John (0670) 367429, North East Area.
BAR Code Reader, teaching pack, £60. Omni - Reader Optical character reader, £70. Tel: Crowthorne (0344) 776894.
MASTER 128, BBC green hi-res monitor, pair Cumana 40T SS drives, 30 blank diskettes. ViewStore, joysticks, all manuals, boxed, £675. Tel: Weybridge 857476.
BBC B 40/80T dual drives, colour monitor, ATPL board. Joystick, View, ViewSheet, ViewStore, Disc Doctor, Toolkit, Sleuth, £520. Tel: Reading 864070.
BBC 1.2 Torch graduate 80T D/D BBC to MS DOS and other software manuals, £500. Tel: (04895) 83831.
FOR SALE: BBC B includes DFS interface + games + mags, £220. InterWord also for sale, £35. Tel: Robert (0322) 430179.
BBC B, dual 40/80 discs cassette, colour monitor, ROM/RAM expansion, mouse, joysticks, lots of books, software, £550. Tel: (0628) 39595.
ELECTRON, ROMbox + userport mouse AMX ArtView. Lots of original software, joystick and interface, excellent condition, £250 ono. Tel: Karl (0532) 554474.
BBC B OS 1.2 graphics ROM, Voltmace joystick, cassette deck, games, books and manuals, excellent condition, £225 ono. Tel: Salisbury (0722) 23278.
BBC B 0.9 DFS, £175. 80T Teac DS drive, £85. Epson RX80 FT+, £150. Phillips monitor/TV, £150. Linnet modem + Commstar II, £110. Boxed, manuals. Tel: (0606) 842714 after 7pm.
BBC 1.20, Microvitec colour monitor, 100k 40/80T disc drive, games, joysticks, books, excellent condition, £900. Tel: Nick (0959) 71339 weekends.
DUAL drives DS40/80T PSU, £160. Single SS 40T, £46. Solidisk 256k 4m, £60. DFDL + ADFS, £40. Viglen BBC case, £35. Speech upgrade, £20. Tel: 01-903 5881.
ELECTRON PRES ADFS 3.5" disc drive, £90. Plus 1, £40, both for £120. Both brand new. Tel: Dave (0482) 48277.
BBC B Issue 7 ADFS Solidisk 2meg 256, two 80T drives, InterWord - Sheet - Base, tape machine. Offers? Tel: (0260) 276263.
DISC drive 40T SS, boxed as new, cables & software, £22. Tel: (0344) 776894.
NETWORK cable, Acorn part AEH17, IBM part 1657265. Approx 450m. Offers. Tel: 01-490 1444, Graham Bell.
WATFORD 'Le Modem' communications modem, complete with instruction books and control ROM, auto dial and answer, £65. Tel: Woking 72120.
PHONE the Gnome, the bulletin board with the added ingredient - fun! BBC area frame *BBC.0# V23 1200/75, 24 hours on 01-888 8894.
BBC B upgraded Master IBM compatible (Watford co-pro). Viglen console, twin drives, ATPL board, Microvitec colour, ROMs/discs galore, £795 ono. Tel: Bruce 01-607 8350.
512 Co-processor for sale, £150 ono. Complete with mouse, discs and manual, year old. DOS plus manual. Tel: (0698) 883982 eves.
PRINTER, Seikosha GP-100A, parallel interface with cable, manual and screen dump tape (BBC), £60 ono. Tel: Cambridge 880286.
ARCHIMEDES 310 colour system for sale, boxed as new, £850. Will consider part exchange for Beeb + DFS. Tel: Glen 091-2615541.
BBC system, cost over £1400, includes stand, printer, disc drive, lots of software, as new, £350. Tel: Bishops Stortford (0279) 503141.
BBC B (Issue 4) with ATPL ROM/RAM board, Acorn DFS, Disc Doctor, joystick, software, books, £180 ono. Tel: (09278) 3534.
PRINTER Taxan Kaga KP 810, large printer buffer plus extra font software, 18 months old, mint condition, £150. Tel: (0793) 613219 eves.
WATFORD Electronics solderless ROM board RB1201 for BBC, with battery, as new, £25. Tel: Gorsley (098982) 537.
ELECTRON, Plus 1, View, ViewSheet, printer, £150. Games, £60, or individually. (Inc Elite) Books, tape recorders + leads. Tel: (0582) 423050 eves.
JAFA systems second processor for Electron and Plus 1, includes tape operating software and ROM image version, £60. Tel: (0692) 404619.
SONY 14" colour monitor, £90. Plus 3, £80. Plus 1, £20. ROMbox, £20. View and ViewSheet cartridges, £10 each. SW RAM adapter, many others. Tel: (0302) 723681.
BBC model B for sale, with Acorn DFS, SS 40/80T disc drive, joysticks, 50 discs, £270 ono. Tel: (0702) 521903, Simon.
Z88, 128k RAM, BBC - Z88 data transfer cable, £200 ono. Tel: Alec, Edinburgh, 031-664 1833.
BBC B OS 1.2 mint condition plus recorder, Oki Microline 80 dot-matrix printer (80 cps) plus manuals, games and magazines, £300 ono. Tel: (0225) 316969 eves.
WANTED any information on upgrading Master Compact, particularly second or co-processors and tape drive. Tel: Motherwell (0698) 52293 eves.
AMX MOUSE, SuperArt and design, £65. Masterfile II, £7.50. Whiteknight 12, £7.50. Repton 3, Repton Round The World, £5 each. All as new. Tel: (0203) 392802.
COMPUTER CONCEPTS GXR and instructions, £20. Tel: Daniel (0423) 863993 eves. Upgrading to Master.
THREE Electrons, one Plus 1, Plus 3, Acorn recorder, Tatung colour monitor, desk, tapes, cartridges, discs, magazines, £400. Tel: Bristol (0272) 841178 eves.
TORCH-Z80 second processor, complete with manuals and software, £150 ono. Care Electronics 'care system' and five empty cartridges, £15. Tel: (0924) 495506.
BBC bits and pieces 4MHz 32k RAM board, (has slots for 80k of ROM), £40 incl 65 C02. Solidisk real time clock, £14. Model A to B upgrade kit, £25, swops? Tel: (0423) 872045 (Harrogate).
UMI 2B sequencer interface and series 5.01 software upgrade as used by A-Ha, Erasure, Tears For Fears, £200 ono. Tel: (0628) 71005.
BBC Master 128k. 40/80T drive, £200. Quest paint package unused, £15 with manual. Tel: (0239) 78663 eves.
USER port switcher (Care - two way) hardly used, £23. Solidisk 2MEG (32k) board (brand new), £20. Mr Brooke, Shackleton Primary, BFPO 38.
BBC B OS1.2, DFS, Viglen 40/80T drive, colour monitor, View 2.1, Pascal chips, Solidisk SW RAM, £350. Tel: Guildford (0483) 573312 eves.
BBC Master 128 DS/DD 40/80T dual disc drives, colour monitor, manuals, ROMS, mouse, discs, games, magazines, £700 ono. Tel: (0462) 814798.
BBC B, 40/80T DS/DD drive InterWord, AMX Mouse, SuperArt, Kaga high-res monitor, Total Wordprocessor system, £365. Extras. Tel: Tring (044282) 4600.
ELECTRON, Plus 1, Plus 3, View, joystick, interface, recorder, games on disc and tape. Mags, AU and EU, game ROM, manuals, discs, boxed, VGC. Offers? Tel: (0905) 423255.
WANTED Electron Plus 3 and compatible printer. Tel: (0430) 431480. Braithwaite, 32 Boothgate Drive, Howden, North Humberside.
MASTER Turbo KXP1081 printer, mouse, Music 500, monitor, Overview, disc drive, Elite+, software, cassette, will split, £1000. Tel: Paul Jagger 01-886 8594.

FREE PERSONAL AD SERVICE

Fill in the form below to a maximum of 20 words (one in each box) and send it to *Acorn User* Free Ads, 20-26 Brunswick Place, London N1 6DJ. Please use capital letters, write clearly, and remember your name, address and telephone number. Without this full information, supplied on a separate sheet of paper, we regret we cannot carry your Free Ad. We cannot accept entries selling or swapping software. This is a service to readers – no companies please. One entry per form only. Free Ads are carried in the magazine as space permits, and any Free Ads not used within a month of receipt will be disposed of.

ACORN USER'S

DIARY

Serious software

An *Acorn User* Tony must be awarded to 4Mation, for its educational program, *Worlds without Words*. It reaches an exceptionally high standard in packaging, with Concept Keyboard overlays, striking posters, even braille cards all included eye. Brilliant.

Close second with a surprising innovation, was Colton Software, which has put dinky metal hinges on the *Pipedream* box.

Cross-eyed

Diminutive Ben 'Benjamin' Rietti, late provider of Tubelink to the masses (well, okay, to both of you with second processors), has come up with a real award-winning turkey this time. Not content with being able to wordprocess with *View*, he's now got *DoubleView*. It's ideal for cross-eyed journalists like Orson, who like to report both sides of the argument.

But he nearly didn't make it to the *MU* show on time. Ben foolishly admitted that he spent the wee small hours preformatting lots of new discs, while waiting for the programmer to finish the program.

At three in the morning, the software arrived. Dawn broke as Ben tore his hair to the accompaniment of nasty graunching sounds, having totally failed to copy the software onto his new discs. Was it a new software protection scheme? Sadly, no. Ben had used an 80-track drive when formatting the discs 40-track. . .

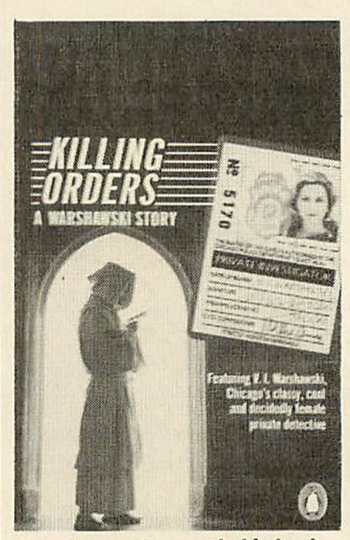
Acorn share scandal

A major scandal linking Acorn to share forgery, industrial espionage, the Mafia, arson and murder has been revealed, reports Stan Froco in Chicago.

The startling revelations come in the book *Killing Orders* by American Sara Paretsky, following enquiries by a Chicago private eye.

Gumshoe V I Warshawski reveals the espionage case in a casual remark on page 62 of the book: 'I own 100 shares of Acorn, a young computer company, given me in payment for an industrial espionage case I'd handled for them.'

Killing Orders further details how an Acorn share certificate is forged, leading an Archbishop who is trying to launder money from the Banco Ambrosiano scandal to put a contract out on Warshawski.



Acorn's secrets revealed in book

The book is published by Penguin at £2.95.

■ Orson Fact in Hoxton adds: Only one industrial espionage case involving Acorn has come to light. In 1982, an Acorn R&D Portakabin was broken into. The then Acorn boss Hermann Hauser had got into the habit of taking all prototype boards home with him, so foiling the intruders.

Note that PI's in the States must come cheap. At 27p each, 100 Acorn shares wouldn't even make the downpayment on a dirty raincoat.



Minerva wonder if *Sigmasheet* will reach their car

More travellers' tales

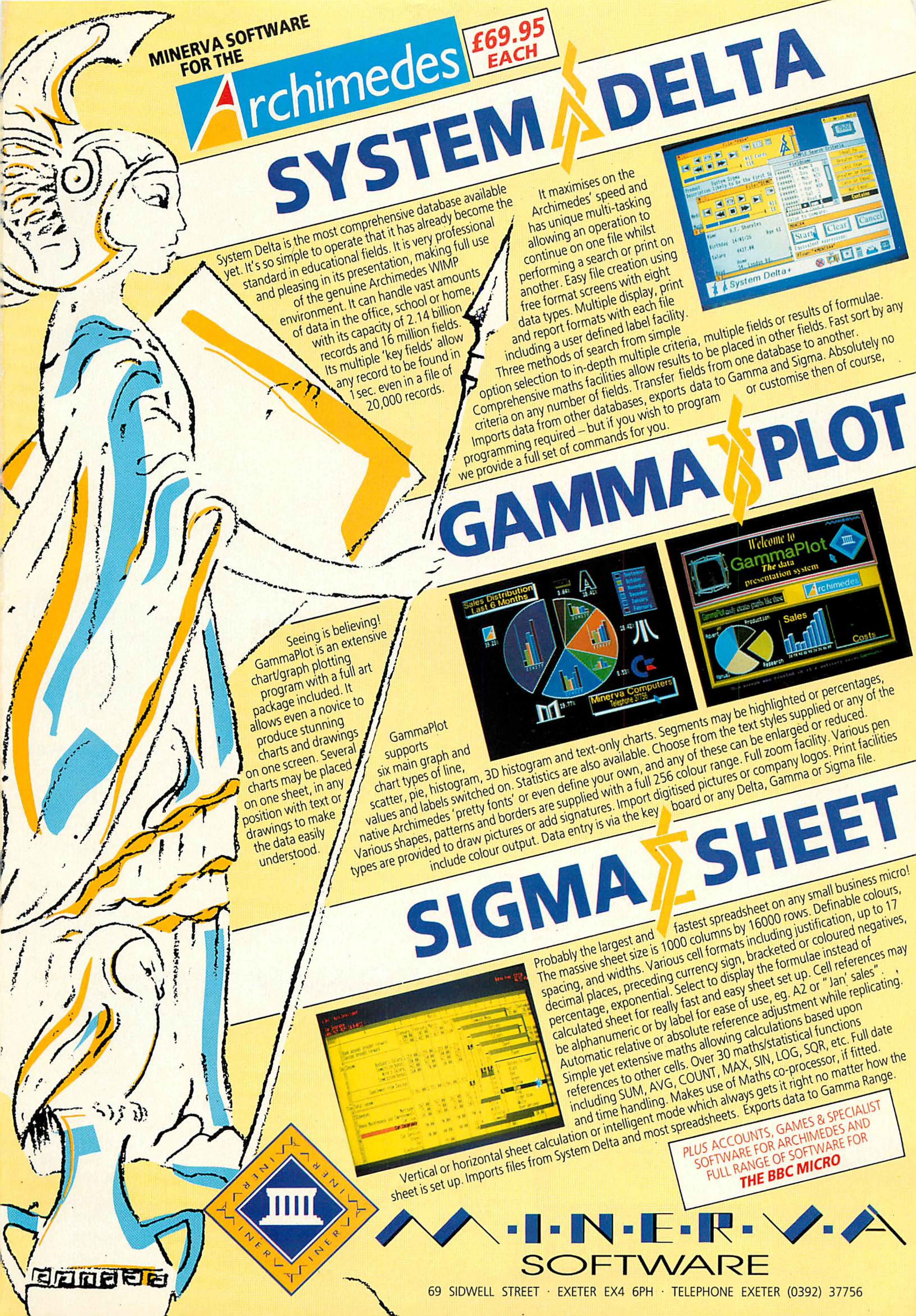
The A680 has recently been crowded with the familiar hordes of turbo-charged Reliant Robins driven by Acorn reps. When stopped for speeding, one confused salesman turned on the friendly policeman. 'It's enough to drive anyone too far, cursed to wander the roads with a bootful of Domesday machines.'

The PC nodded as the rep explained he was late for a meeting at Membury services where he was picking up something from the printers'.

Underground

Acorn User is after having a new sub-editor. Editorial secretary Pauline McLernon, unable to take editor Tony Quinn's appalling attempts to imitate her Irish accent any more, wandered off into a dark corner of the Redwood dungeon. The next morning she realised that the cobwebby corner she had chosen to camp in was none other than the long-deserted sub's desk.

She tried to escape but it was too late. The normally mild-mannered Bell pinned her to the desk with a pile of Joe's Jottings proofs. 'And there's more,' he muttered. 'I want the yellow pages perfect by lunchtime.' Pauline sighed. Feeble puns and threats about late copy swarmed into her mind. Now she was a sub-editor.



MINERVA SOFTWARE FOR THE
Archimedes
£69.95 EACH
SYSTEM DELTA
System Delta is the most comprehensive database available yet. It's so simple to operate that it has already become the standard in educational fields. It is very professional and pleasing in its presentation, making full use of the genuine Archimedes WIMP environment. It can handle vast amounts of data in the office, school or home, with its capacity of 2.14 billion records and 16 million fields. Its multiple 'key fields' allow any record to be found in 1 sec. even in a file of 20,000 records.
It maximises on the Archimedes' speed and has unique multi-tasking allowing an operation to continue on one file whilst performing a search or print on another. Easy file creation using free format screens with eight data types. Multiple display, print and report formats with each file including a user defined label facility. Three methods of search from simple option selection to in-depth multiple criteria, multiple fields or results of formulae. Comprehensive maths facilities allow results to be placed in other fields. Fast sort by any criteria on any number of fields. Transfer fields from one database to another. Imports data from other databases, exports data to Gamma and Sigma. Absolutely no programming required – but if you wish to program or customise then of course, we provide a full set of commands for you.
System Delta
GAMMA PLOT
Seeing is believing! GammaPlot is an extensive chart/graph plotting program with a full art package included. It allows even a novice to produce stunning charts and drawings on one screen. Several charts may be placed on one sheet, in any position with text or drawings to make the data easily understood.
Sales Distribution Last 6 Months
Minerva Computers
Welcome to GammaPlot
The data presentation system
Archimedes
Sales
Costs
GammaPlot supports six main graph and chart types of line, scatter, pie, histogram, 3D histogram and text-only charts. Segments may be highlighted or percentages, values and labels switched on. Statistics are also available. Choose from the text styles supplied or any of the native Archimedes 'pretty fonts' or even define your own, and any of these can be enlarged or reduced. Various shapes, patterns and borders are supplied with a full 256 colour range. Full zoom facility. Various pen types are provided to draw pictures or add signatures. Import digitised pictures or company logos. Print facilities include colour output. Data entry is via the key board or any Delta, Gamma or Sigma file.
SIGMA SHEET
Probably the largest and fastest spreadsheet on any small business micro! The massive sheet size is 1000 columns by 16000 rows. Definable colours, spacing, and widths. Various cell formats including justification, up to 17 decimal places, preceding currency sign, bracketed or coloured negatives, percentage, exponential. Select to display the formulae instead of calculated sheet for really fast and easy sheet set up. Cell references may be alphanumeric or by label for ease of use, eg. A2 or "Jan' sales". Automatic relative or absolute reference adjustment while replicating. Simple yet extensive maths allowing calculations based upon references to other cells. Over 30 maths/statistical functions including SUM, AVG, COUNT, MAX, SIN, LOG, SQR, etc. Full date and time handling. Makes use of Maths co-processor, if fitted. Vertical or horizontal sheet calculation or intelligent mode which always gets it right no matter how the sheet is set up. Imports files from System Delta and most spreadsheets. Exports data to Gamma Range.
PLUS ACCOUNTS, GAMES & SPECIALIST SOFTWARE FOR ARCHIMEDES AND FULL RANGE OF SOFTWARE FOR THE BBC MICRO
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REPTON THRU TIME

PREHISTORIC REPTON

PRESENT DAY REPTON

EGYPTIAN REPTON

VICTORIAN REPTON

FUTURE REPTON

50000 B.C.

2000 B.C.

A.D. 1850

A.D. 1988

A.D. 3000

REPTON — THE TIME TRAVELLER

Where did Repton come from? Does he have an Egyptian mummy? Is he the real Jack the Repper? Where is he now? Where is he going to?!
We have been inundated with these and many other questions about our lovable hero. Now all is revealed in 40 new screens that vividly reveal Repton's evolution from prehistory to the future.
The PREHISTORIC screens with their caves, mountains and volcanoes, have Repton battling against pterodactyls and dinosaurs to collect edible berries. In EGYPTIAN times, Repton chases around pyramids and sphinxes collecting scrolls and meeting a mummy or two! Amidst the smog and grime of VICTORIAN times, Repton collects gold coins — but can he avoid the police and the gallows? PRESENT DAY Repton has even greater dangers to face as he rushes around the city's jungle of parking meters and skyscrapers, looking for cans of cola. If the gangster's machine gun doesn't get him, the traffic wardens will. Amazingly Repton may make it to the FUTURE. As he zooms through space collecting crystals, the Martians give chase. Will he succeed or disappear forever into the infinite depths of a black hole? Only you can help Repton Thru Time!


THE SCREEN EDITOR

Each copy of Repton Thru Time includes:
● the Repton 3 main program ● the Repton 3 editor and ● the 40 new game screens.

BBC Micro Cassette.............**£6.95**
BBC Micro 5¼" Disc.............**£7.95**
Acorn Electron Cassette.............**£6.95**
BBC Master Compact 3½" Disc..**£9.95**

(Compatible with the BBC B, B+ and Master Series computers).

The screen pictures show the BBC Micro version of the game.


THE CHARACTER EDITOR

PRIZE COMPETITION

If you complete all 40 screens of Repton Thru Time without using passwords, you can enter our competition. A draw will be made from all the correct entries received to select 25 prize winners. Each will receive an EGYPTIAN REPTON Cuddly Toy and a signed certificate.
Closing date: 30th September, 1988.


REPTON ORIGINAL
Cuddly Toy

SPECIAL OFFER — NEW!

A unique range of Repton Cuddly Toys is now available. Each Cuddly Toy is about 24 inches high and has a realistic face and features corresponding to the particular Repton character. They are only available from Superior Software.

REPTON ORIGINAL **£9.95**
ARCTIC REPTON **£9.95**
TEENAGE REPTON **£9.95**
Postage and packing free.





Please make all cheques payable to "Superior Software Ltd".



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